Developing Resources and Programming for the Emerging Carbon Market in Row Crop Production

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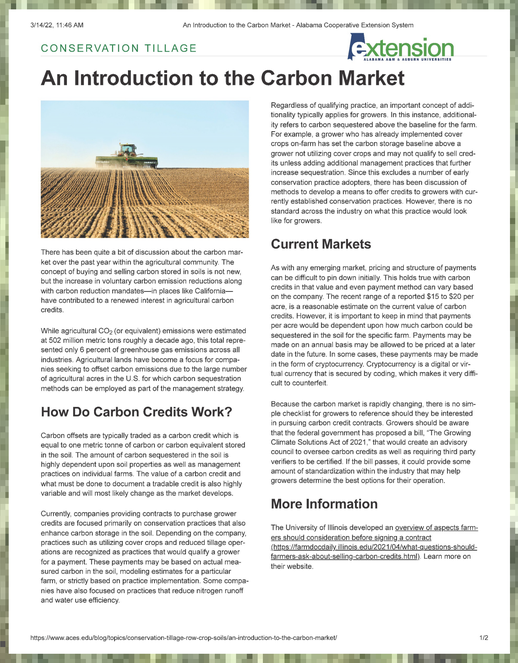
Carbon Market

Reduction of greenhouse gas (GHG) emissions and minimized carbon footprint has become a focal point for policy and industry in recent years. While relatively few mandates exist in the United States for reduced emissions, the voluntary actions of multiple companies have increased interest and opportunity for carbon credit purchase and sell. A carbon credit, one metric ton of CO_2 or equivalent, can be generated through any number of land management practices in pasture, forestry, and row crop acreage. Although U.S. EPA reports agriculture collectively as responsible for approximately 10% of GHG emissions (2019), it falls well short of other industries such as transportation, electrical, and manufacturing which range from 23-29%. Additionally, agriculture remains one of the only industries that functions as a GHG source as well as sink (CRS 2020). This ability to capture carbon through processes such as conservation tillage and cover crop use is key to participation by row crop producers in the carbon market.

While row crop producers have some access to the carbon credit market, the market is not standardized in terms of credit value or in terms of eligibility. Each company offering carbon credit contracts can operate under very different requirements which can affect payments as well as contract length.

It is important that growers understand the basics of the carbon market as well as the management practices that can potentially qualify for carbon credit payments before they sign a contract. Resources and programming from the Farm and Agribusiness Team were designed to cover basic carbon market information, conservation practices that typically are eligible for payments, and provide up to date information as the market matures.

Figure 1. The Extension Publication provides a general overview of the carbon market, how carbon is sequestered, and how payments may be calculated.



3/14/22, 11:46 AM An Introduction to the Carbon Market - Alabama Cooperative Extension System

CONSERVATION TILLAGE

An Introduction to the Carbon Market

There has been quite a bit of discussion about the carbon market over the past year within the agricultural community. The concept of buying and selling carbon stored in soils is not new, but the increase in voluntary carbon emission reductions along with carbon reduction mandates—in places like California—have contributed to a renewed interest in agricultural carbon credits.

While agricultural CO_2 (or equivalent) emissions were estimated at 502 million metric tons roughly a decade ago, this total represented only 6 percent of greenhouse gas emissions across all industries. Agricultural lands have become a focus for companies seeking to offset carbon emissions due to the large number of agricultural acres in the U.S. for which carbon sequestration methods can be employed as part of the management strategy.

How Do Carbon Credits Work?

Carbon offsets are typically traded as a carbon credit which is equal to one metric tonne of carbon or carbon equivalent stored in the soil. The amount of carbon sequestered in the soil is highly dependent upon soil properties as well as management practices on individual farms. The value of a carbon credit and what must be done to document a tradable credit is also highly variable and will most likely change as the market develops.

Currently, companies providing contracts to purchase grower credits are focused primarily on conservation practices that also enhance carbon storage in the soil. Depending on the company, practices such as utilizing cover crops and reduced tillage operations are recognized as practices that would qualify a grower for a payment. These payments may be based on actual measured carbon in the soil, modeling estimates for a particular farm, or strictly based on practice implementation. Some companies have also focused on practices that reduce nitrogen runoff and water use efficiency.

Regardless of qualifying practice, an important concept of additionality typically applies for growers. In this instance, additionality refers to carbon sequestered above the baseline for the farm. For example, a grower who has already implemented cover crops on-farm has set the carbon storage baseline above a grower not utilizing cover crops and may not qualify to sell credits unless adding additional management practices that further increase sequestration. Since this excludes a number of early conservation practice adopters, there has been discussion of methods to develop a means to offer credits to growers with currently established conservation practices. However, there is no standard across the industry on what this practice would look like for growers.

Current Markets

As with any emerging market, pricing and structure of payments can be difficult to pin down initially. This holds true with carbon credits in that value and even payment method can vary based on the company. The recent range of a reported $15 to $20 per acre, is a reasonable estimate on the current value of carbon credits. However, it is important to keep in mind that payments per acre would be dependent upon how much carbon could be sequestered in the soil for the specific farm. Payments may be made on an annual basis may be allowed to be priced at a later date in the future. In some cases, these payments may be made in the form of cryptocurrency. Cryptocurrency is a digital or virtual currency that is secured by coding, which makes it very difficult to counterfeit.

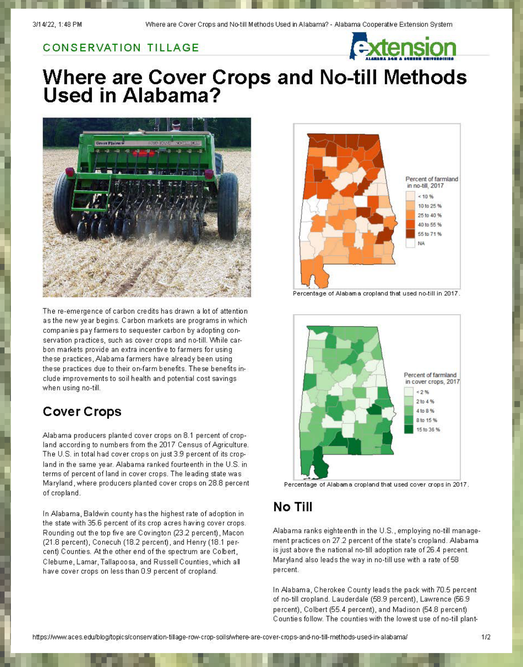
Because the carbon market is rapidly changing, there is no simple checklist for growers to reference should they be interested in pursuing carbon credit contracts. Growers should be aware that the federal government has proposed a bill, "The Growing Climate Solutions Act of 2021," that would create an advisory council to oversee carbon credits as well as requiring third party verifiers to be certified. If the bill passes, it could provide some amount of standardization within the industry that may help growers determine the best options for their operation.

More Information

The University of Illinois developed an overview of aspects farmers should consideration before signing a contract (https://farmdoc.illinois.edu/2021/04/what-questions-should-farmers-ask-about-selling-carbon-credits.html). Learn more on their website.

https://www.aces.edu/blog/topics/conservation-tillage-row-crop-soils/an-introduction-to-the-carbon-market/ 1/2

Figure 2. Cover crop and no-till practices are critical components for on-farm carbon sequestration and are the basis for carbon credit payments for most producers.



3/14/22, 1:48 PM Where are Cover Crops and No-till Methods Used in Alabama? - Alabama Cooperative Extension System

CONSERVATION TILLAGE

Where are Cover Crops and No-till Methods Used in Alabama?

The re-emergence of carbon credits has drawn a lot of attention as the new year begins. Carbon markets are programs in which companies pay farmers to sequester carbon by adopting conservation practices, such as cover crops and no-till. While carbon markets provide an extra incentive to farmers for using these practices, Alabama farmers have already been using these practices due to their on-farm benefits. These benefits include improvements to soil health and potential cost savings when using no-till.

Percentage of Alabama cropland that used no-till in 2017.

Percentage of Alabama cropland that used cover crops in 2017.

Cover Crops

Alabama producers planted cover crops on 8.1 percent of cropland according to numbers from the 2017 Census of Agriculture. The U.S. in total had cover crops on just 3.9 percent of its cropland in the same year. Alabama ranked fourteenth in the U.S. in terms of percent of land in cover crops. The leading state was Maryland, where producers planted cover crops on 28.8 percent of cropland.

In Alabama, Baldwin county has the highest rate of adoption in the state with 35.6 percent of its crop acres having cover crops. Rounding out the top five are Covington (23.2 percent), Macon (21.8 percent), Conecuh (19.2 percent), and Henry (18.1 percent) Counties. At the other end of the spectrum are Colbert, Cleburne, Lamar, Tallapoosa, and Russell Counties, which all have cover crops on less than 0.9 percent of cropland.

No Till

Alabama ranks eighteenth in the U.S., employing no-till management practices on 27.2 percent of the state's cropland. Alabama is just above the national no-till adoption rate of 26.4 percent. Maryland also leads the way in no-till use with a rate of 58 percent.

In Alabama, Cherokee County leads the pack with 70.5 percent of no-till cropland. Lauderdale (58.9 percent), Lawrence (56.9 percent), Colbert (55.4 percent), and Madison (54.8 percent) Counties follow. The counties with the lowest use of no-till plant-

https://www.aces.edu/blog/topics/conservation-tillage-row-crop-soils/where-are-cover-crops-and-no-till-methods-used-in-alabama/ 1/2

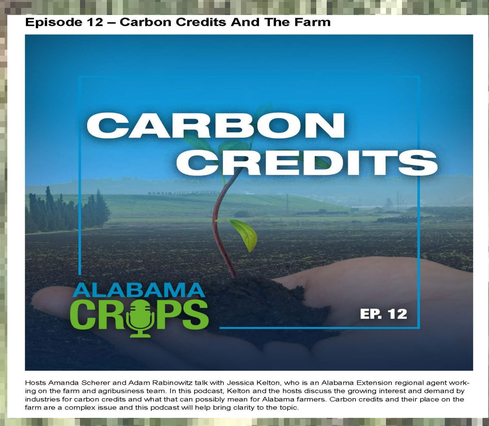
Implementation and Resources Developed

Resources developed include:
*Extension Publications
*Alabama CoOp Magazine Article
*Podcasts
*Extension News Articles

Programming implemented:
*Carbon Market for Landowners Program- Barbour County Alabama
*Carbon Market for Row Crop Production- Alabama Crop Improvement Meeting
*Implications of Carbon Industry on Conservation Systems- SPARC webinar series
*Introduction to Carbon Market- Forestry Webinar Wednesday

Upcoming Programs:
*Carbon Sequestration as a Featured Topic in the Year-Long State Campaign- Down to Earth- Agriculture Sustains Alabama

Figure 3. A carbon credit podcast was released through the Alabama Crops Podcast
in May 2021 and can be streamed from: https://www.aces.edu/go/carbonpodcast



Hosts Amanda Scherer and Adam Rabinowitz talk with Jessica Kelton, who is an Alabama Extension regional agent working on the farm and agribusiness team. In this podcast, Kelton and the hosts discuss the growing interest and demand by industries for carbon credits and what that can possibly mean for Alabama farmers. Carbon credits and their place on the farm are a complex issue and this podcast will help bring clarity to the topic.

References
Congressional Research Service. 2021. Greenhouse Gas Emissions and Sinks in U.S. Agriculture. https://sgp.fas.org/crs/misc/IF11404.pdf

US EPA. 2019. Sources of Greenhouse Gas Emissions. https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

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