




Agricultural Carbon and Ecosystem Services Markets – An Overview

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The agricultural sector, public and private actors are joining to reduce the causes of and impacts from climate change, reduce water stress, improve water quality, and improve the environment while equitably feeding a global population expected to top 9 billion by 2050.

According to the UN Food and Agriculture Organization, ecosystem services provide a multitude of services to society including providing nutritious food and clean water, regulating disease and climate, pollinating crops and soil formation, and recreational, cultural, and spiritual benefits. Regenerative agriculture plays a key role in increasing ecosystem services and can increase agricultural production system resiliency.

Agricultural Carbon and Ecosystem Services Market Programs

The term "agricultural carbon markets" is commonly used as an umbrella term for voluntary and regulatory market programs that that remove carbon dioxide (CO_2) from the air, increase soil carbon sequestration, and reduce methane (CH_4) and nitrous oxide (N_2O). Ecosystem services market programs focus on carbon as well as other ecosystem services including water quality, water quantity, and biodiversity.

Whatever the name, the goals of market programs include natural resource conservation, preservation, restoration, and environmental impact mitigation are a powerful tool to protect and grow ecosystem services. Additionally, these market programs can:

- Incentivize agricultural producers to implement regenerative agricultural practices and systems.
- Help prevent regulatory pressures.
- Provide cost-share approaches for practice adoption and technical support.
- Meet corporate supply chain, value chain and societal demands.
- Generate financial value and reduce risks for producers, corporations, society, and the planet.

Offsets vs. Insets

Within agricultural carbon markets, there are two types of market focuses – Scope 1 or Offset Markets and Scope 3 or Inset Markets[1]. Most agricultural carbon market programs focus on either offsets or insets.

Carbon offsets are credits representing a reduction in greenhouse gas (GHG) emissions—or an increase in carbon storage (e.g. through land restoration or the planting of trees)—that are used to compensate for GHG emissions that occur elsewhere, typically in another sector. Offset credits allow greenhouse gas emission increases elsewhere; they can cross jurisdictional boundaries (credits from a project in India can be used by a US company), and sectoral boundaries (agricultural emissions reductions can be used and counted towards emissions reduction by the energy or transport sector).

Carbon insets are reductions in GHG emissions or increased carbon storage and are absolute – in other words, they do not allow emissions to be increased elsewhere. They also must occur and remain (or be counted in) the same sector and cannot cross jurisdictional boundaries. Carbon insets enable a company to reduce their indirect supply chain emissions. As an example, a food and beverage company could invest resources to enable their supply chain to adopt climate protection practices – or pay for them.

Agricultural Carbon and Ecosystem Services Market Program Details

Although market programs differ in terms of their specific requirements, almost all share similar general eligibility requirements. Before signing up for any market program, it is important to understand those requirements.

General Eligibility:

- **Ownership of credit/outcomes**: market programs require proof that the credit or outcome sold has the right to be sold. Often this means that a producer either needs to own their property where the credit/outcome occurs, or that they have ownership rights to that credit/outcome from the landowner.
- **Practice changes**: some market programs require new practice change adoption – this may include planting cover crops, reducing tillage practices (or moving to no-till systems), and implementing nutrient management practices. Some programs pay producers for practice change adoption while others pay for the measured impacts from adopting new practices.

[1] Scope 2 markets also exist but focus on GHG emissions associated with energy production.

- **Agricultural land conversion**: land enrolled in many programs cannot have been converted to agricultural land (i.e., from grasslands or forested land) in the past 10 years for some programs, 20 years for others.
- **Double enrollment:** the same acres cannot be enrolled in more than one market program and that acreage cannot be subject to regulatory requirements since these programs are voluntary in the U.S.
- **Enrollment in public conservation programs:** Many programs allow enrollment in public conservation or incentive programs and market programs simultaneously.

Other Considerations

In addition to the general requirements that are common across most market programs, there are many considerations that producers should consider prior to enrollment to ensure they are choosing the program that best fits their needs and production system. Other considerations include:

- **Geography**: some market programs are national while some pertain only to specific regions, states, or production systems.
- **Production systems/crop types:** many programs in the U.S. focus on corn/soy row crops, while other programs include other commodities and production systems.
- **Acreage**: Some programs have minimum acreage requirements.
- **Program focus:** some programs only include carbon such as GHG emissions reductions and/or removals (some only focus on carbon removals through increased soil carbon sequestration); others include water quality, water quantity, and/or biodiversity and can "stack credits". Credit stacking opportunities are more common in ecosystem services market programs.
- **Costs**: some programs require producers to pay to enroll, or for sampling or verification. Some require producers to subscribe to or buy company products; others have no participation costs. Additionally, it is helpful to understand what percentage of credit payments go to the producer and what percentage goes to the market program.
- **Compensation type:** as noted, programs may pay for either practice changes/practice adoption or for quantified outcomes. Producers may be paid a set price per ton carbon dioxide reduced or removed, or by the acre.
- **Credibility:** producers may want to know if their credits or outcomes are verified by a third party and whether the program's protocols are validated.

- **Contract length**: participation requirements are highly variable among market programs and can range from 1 to 5- or even 10-year contracts. It is also good to know if penalties are assessed if leaving a contract early.
- **Data ownership**: some programs require producers to relinquish ownership of their data, other programs allow the producer to continue to own their data.
- **Data security and privacy**: program data security and privacy policies will identify whether a producer's data can be sold or used for other purposes. Ag Data Transparent certification showcases those market programs that commit to transparent program operations that protect producer data.

External Program Comparisons

For comparisons across market programs that highlight each programs' eligibility requirements, and other considerations, there are various online resources that compare programs listed below. Note that these comparisons are only as good as their data – check the date on the most recent comparison to ensure the information remains current.

Ag Data Transparent

American Farmland Trust publication on Agricultural Carbon Programs

Illinois Sustainable Ag Partnership

Iowa State University Extension

United Soybean Board Carbon Market Programs