

Ecosystem Market Information

Opportunity and Program Comparison

According to the US Environmental Protection Agency (EPA), ecosystem services markets allow companies, communities, and other beneficiaries to pay landowners and managers *to protect, restore or mitigate for* impacts to ecosystems. While many of the practices that offer the greatest ecosystem benefits are typically encouraged via traditional state and federal financial assistance programs, market payments are generated via outcomes verified at the field level and are not necessarily practice-specific. Current active and pilot markets exist for several ecosystem services including carbon sequestration and greenhouse gas (GHG) reductions, water quality and quantity improvements, as well as wetland and habitat creation, among others. This resource focuses on agricultural opportunities for carbon and water quality markets.

What is a carbon offset – According to the [US Government Accountability Office](#), a carbon offset is defined as a measurable reduction of GHG emissions from an activity or project in one location that is used to compensate for emissions occurring elsewhere. Carbon offsets are typically measured in metric tonnes (2,205 pounds) of carbon dioxide equivalent (CO₂e).

What is a water quality credit – The [EPA defines a water quality credit](#) as a unit of pollutant reduction usually measured in pounds equivalent. Credits can be generated by industrial and municipal point sources implementing new treatment technologies or via implementation of management practices that improve water quality above an established baseline. General water quality market information can be found on EPA's [Water Quality Trading Basics and Policy Resources Page](#).

Planning Resources to Assist in Moving from Practices to Outcomes

[COMET-Planner](#) provides general estimates of the GHG impacts of certain NRCS conservation practices. Estimates can be supplied in tonnes of CO₂e reduction potential per acre per year.

American Farmland Trust's (AFT) [CaRPE Tool](#) expands the utility of the data reported by COMET-Planner by integrating cropland and grazing land acreages and data from the 2017 Census of Agriculture. AFT's recent [Combating Climate Change on US Cropland](#) Report highlights an application of this tool along with a summary of the technical capacity of cover cropping and no-till to sequester carbon and reduce GHG emissions.

Additionally, AFT's [Guide to Water Quality, Climate, Social and Economic Outcomes Estimation Tools](#) features 14 outcome estimation tools and two methods.

Note – While this resource list is not intended to be exhaustive or comprehensive, the above referenced project pages and reports provide extensive reference lists that can serve as a great starting point for anyone interested in digging deeper into these topics.

Using This Resource

Information in this document was developed concurrent with webinars produced and hosted by the Illinois Sustainable Ag Partnership (ISAP). Video recordings of all five webinars are available on [ISAP's website](#). All program information on the following pages was provided and vetted by company representatives and was current at the time of publication.

Questions regarding this document can be sent to Emily Bruner, Midwest Science Director for American Farmland Trust (ebruner@farmland.org) or Jean Brokish, Midwest Program Manager (jbrokish@farmland.org).

Introduction to Featured Entities

The information below was provided and vetted by company representatives. Programs are evolving rapidly and interested parties are encouraged to review specific company sites listed below or visit ISAP's website (ilsustainableag.org/ecomarkets).

MARKET ENTITIES (Table 1) – information current as of February 2021.

Nori – In pilot phase, project enrollment is currently available nationwide. Two projects have sold and received payment for ~30,000 credits to date. Planning to expand to Canada, Brazil and Eastern Europe in the next 2 to 3 years. <https://nori.com/>

Indigo Ag – Project enrollment currently available in 21 states including: AR, CO, GA, IA, IL, IN, KS, KY, LA, MN, MO, MS, NC, ND, NE, OH, OK, SC, SD, TN, TX. Piloting expansion in Europe. <https://carbon.indigoag.net>

Soil and Water Outcomes Fund – Project enrollment currently available in select counties in Iowa, Illinois, and Ohio. Planning to expand to additional geographies in crop year 2022. <https://www.theoutcomesfund.com/>

Ecosystem Services Market Consortium (ESMC) – In pilot phase, project enrollment currently available in select U.S. regions including: Corn and Soy Belt, Great Plains, Great Lakes, Pacific Northwest, and California. Anticipated national market launch to include payment for water quantity and biodiversity ecosystem services in addition to carbon, net GHGs, and water quality in harvest year 2022-2023. <https://ecosystemservicesmarket.org/>

INPUT PROVIDERS (Table 2) – information current as of June 2021

Bayer Crop Science – Bayer's US Carbon Program pays \$3 per acre for reduced tillage (strip-till or no-till), \$6 per acre for cover crop adoption, and \$9 per acre for adopting both practices, per year, subject to verification and validation. Bayer's US [Carbon Program](#) is currently available in 17 states including: IN, IL, IA, KS, WI, ND, SD, NE, MN, MO, MI, OH, AR, MS, LA, MD, and DE and looking to expand eligible geographies, crops and practices.

Corteva Agriscience – Corteva leverages Granular Insights to assist farmers in earning an estimated \$5-20 per acre by introducing cover crops and/or reduced tillage. [Corteva's Carbon Initiative](#) is currently available in Illinois, Indiana, and Iowa with plans to expand to additional states later in 2021 and into 2022.

Nutrien – Nutrien's [Carbon Program](#) is designed to provide incentive payments for climate smart practice implementation or carbon and water outcomes, depending on the pilot. **Nutrien is currently testing pilot projects across 15 US states and 3 Canadian provinces**

DATA PLATFORMS (Table 3) – information current as of June 2021

CIBO – CIBO offers carbon sellers and buyers an innovative, efficient carbon market. CIBO calculates the Regenerative Potential for all parcels in the US so farmers can understand the potential of a parcel to generate carbon credits. CIBO then provides the tools that enable a user to calculate Carbon Credits, based on their actual or future practices. **Current enrollment in [CIBO Impact](#) is open to any corn or soybean grower in the US.**

FBN / Gradable – Gradable, launched by Farmer's Business Network, Inc. (FBN), provides new technology and services that facilitate the scoring, sourcing, and pricing of Low-Carbon Grain. Gradable is active in carbon credit markets as well as supply chain programs in food, feed, and fuel and offers crop nutrition services, including soil health sampling and agronomic recommendations through Gradable Plan. [Gradable Carbon](#) launched in Spring of 2021 and is available throughout the US.

Truterra – Truterra is a farmer-owned, retailer-driven sustainability platform built to help growers measure and track their on-farm stewardship journey via the [Truterra™ Insights Engine](#). The data and insights within Truterra enable participation in ecosystem markets such as Carbon. **The next TruCarbon offer is set to launch in late 2021/early 2022 and will be available nationally.**

TABLE 1: MARKET ENTITIES

As of February 2021

	Nori	Indigo Ag	Soil & Water Outcomes	ESMC
Acreage Min/Max	None	One-field min, no max	None	None
Contract Length	10 yrs	5 yrs	Annual with yearly renewal	Pilot – Annual Market Launch – Scope 1: 10 yrs; Scope 3: TBD
New Practice Requirement	Yes, with a look-back of up to 5 years during pilot phase	Yes, with a look-back of 2 growing seasons	Yes	Yes, but investigating potential of payments to producers already implementing conservation practices for Scope 3
Payment Schedule	End of month when offset credit is sold	50% yr 1, 20% yr 2, 10% yrs 3, 4, 5	Annually, split 50/50–1 shortly after signing, 1 after verification	Pilot – Annual Market- Launch - Annual to every 5 yrs depending on Scope for carbon 1 vs 3, respectively; annual for water quality.
Ability to Enroll Same Fields in Gov’t Programs/ Other Markets	Designed to stack with both	Designed to stack with both, but other incentives cannot include payments for carbon credits or related assets (financing is okay)	No Note – payment for water quality and carbon outcomes	Designed to stack with gov’t programs; individual fields cannot be in two market programs. Note – ESMC internally stacks carbon with GHG reductions, water quality, and water quantity.
Outcome Estimation	Soil sample reference network-based modeling (Soil Metrics) - cost incurred by Nori. Farmer has option to true-up via soil sampling - farmer incurs sampling cost.	Modeling (biogeochemical and statistical) + soil sampling, Indigo assumes cost (Indigo does not charge growers for anything)	Modeling, with 10% of fields subject to in-field soil and water sampling at no cost to farmer	Modeling (peer reviewed biogeochemical model) + soil sampling. ESMC assumes costs and includes in asset price to buyers.
Third Party Practice Verification	Minimum once every 3 years; standard audit procedure (review representative sample of receipts and invoices)	Random site visits and evidence checks, registry-approved methodology.	Yearly field visits, remote sensing	Scope 1– small subset of producers randomly selected for site visit + remoting sensing. Scope 3 –smaller subset of producers randomly selected for site visit +remote sensing.
Data Collected on Enrollment	Farm operational data – previous 10 years OR proprietary “ <i>Smart Defaults</i> ” option	Basic farmer info, field boundaries, and commitment to new practice(s)	Farm operational data – 2-3 years historical baseline plus 2-3 years of proposed practice change(s)	Scope 1 – detailed farm operational data Scope 3 – some operational data; Soil sampling and remote sensed data for both.
Penalty for Temporary Break in Practice Implementation	Farmer commits to make best effort to retain C stocks; not bound to any practice plan; not liable for <i>force majeure</i> C losses.	Payment pauses until soil carbon returns to previous level. Methodology prevents credits from being overestimated.	Breach of contract, farmer would not receive payment	Stall in soil carbon gains requires initial gains to be realized before additional credit issuance/payment; no consequences for dropping out of pre-market launch pilots
Enrollment Assistance	Supply Account Managers on-call; regular training; direct assistance with enrollment process	Customer success hotline or webchat options	Provided via staff and affiliates	Producer’s preferred advisor (e.g. conservation district staff, CCAs) can be trained to assist; option to import data from 3 rd party platform
Technical / Agronomic Assistance	NA (but supply account managers include trained agronomists)	Free in-house agronomic guidance, supplemented with on-the-ground help	Free conservation agronomists on staff	Provided by ESMC’s member organizations and partners (e.g. conservation district, CCAs, NGOs).

TABLE 2: INPUT PROVIDERS

As of June 2021

	Bayer	Corteva	Nutrien
Acreage Min/Max	10 acre per field minimum	None	None
Contract Length	10 yr enrollment (minus yrs farmer was paid for historical practices) + additional 10 yr retention of practices; no penalty for leaving the program if written notice is provided 30 days prior to end of current program yr.	10 yr contract, option to opt-out at the end of yr 2. Opt-out option at the end of each year for years 3 – 10.	1 to 3 years, depending on pilot project
New Practice Requirement	New practices adopted within 10 yrs are eligible for payback for up to 5 yrs.	Yes, no look-back period	Yes, no look-back period
Payment Schedule	Payments are made upon practice verification. For practices used in Fall 2021/Spring 2022, payments should be expected in Q4 of 2022.	Payments are made after practices are verified. For practice changes made in Fall 2021/Spring 2022, payments would be made in Spring 2023.	Pilot dependent, but most often at the end of the crop year after practice implementation is verified.
Ability to Enroll Same Fields in Gov't Programs/ Other Markets	Growers can participate in state and federal programs if they do not generate greenhouse gas reduction assets.	Farmers can participate in federal and state conservation programs.	Pilot project dependent – some can overlap, some restrict the acres from participating in other programs at the same time
Outcome Estimation	Soil sampling every 5 years, with carbon sequestration modeled on a yearly basis via external peer-reviewed models	Practice changes are logged in the Granular Insights platform. This data is shared with ESMC, who will quantify farmers' soil carbon storage and certify their credits.	Pilot project dependent – but generally through a combination of modeling and sampling of both water and soil
Practice Verification	Utilizes various methods, including the Climate FieldView platform and Operational Tillage Information System (OpTIS) technologies, plus soil sampling every 5 yrs.	Soil sampling by Corteva, with additional quantification and verification conducted by ESMC.	Verification of all data is done for all projects by the grower and where needed by Nutrien staff or other partners.
Data Collected on Enrollment	During enrollment, growers share their fields via Climate FieldView and select which practices are used and when they were adopted.	Current crop year + 3 yrs of historical field data, including crop type, nitrogen applications, tillage data, harvest data, and cover cropping data (if applicable).	Field level practice data, soil samples, and field shape files
Penalty for Temporary Break in Practice Implementation	Situations in which one or both selected practices are not implemented due to environmental conditions will be evaluated on a case-by-case basis.	If the weather prevents the use of practice change, a grower will see reduced crediting and thus reduced payments.	Pilot-project dependent
Enrollment Assistance	Customer Success team available to answer questions via carbonprogram@bayer.com or 833-877-7934.	Assistance in navigating program participation (onboarding to payment) provided by Corteva Carbon Sales and Support. Visit Corteva.com/carbon.	Pilot-project dependent
Technical / Agronomic Assistance	Free agronomic support from Bayer agronomists. Cover crop discount and selection available through LaCrosse Seed.	Free agronomic recommendations on practice changes and implementation provided by local Pioneer Seed Agents or other Corteva Advisors.	Free technical assistance from a variety of Nutrien staff.

TABLE 3: DATA PLATFORMS

As of June 2021

	CIBO	FBN / Gradable	Truterra
Acreage Min/Max	None	Minimum of 250 acres	No minimum enrollment acreage, but minimum field size is 2.5 acres
Contract Length	1, 5 and 10-year terms	5 years	Durability period of 20 years with initial program; future terms subject to change based on buyer preference.
New Practice Requirement	Yes. 2 types of credits offered - one for new adopters with credits issued through a major credit registry and one for ongoing practices with credits issued by CIBO.	Yes, 2-year look-back period	Eligibility criteria will vary by program-specific offering; spring 2021 offer had a 5-year look back.
Payment Schedule	Farmers get paid after their credits sell. Payments currently dispersed on a quarterly basis.	Through the ability to “bank” credits farmers control when they offer their credits for sale. Farms enrolled in Spring 2021 are eligible to begin selling credits in Spring 2022.	Spring 2021 offer has full payout in summer 2021; future programs may involve different terms.
Ability to Enroll Same Fields in Gov’t Programs/ Other Markets	Growers can enroll in other programs if those programs are not paying for emissions reduction claims. For example, Gov’t conservation programs are allowed, enrollment in additional credit markets is not allowed.	Can enroll in other programs if paid claims are not being made. Fields cannot be enrolled in other carbon credit markets for the duration of the contract.	Participation in conservation cost-share programs does not disqualify participation.
Outcome Estimation	GHG and carbon sequestration impact are quantified via academically validated modeling. Audit soil sampling of a subset of farms is conducted every 5 years.	Environmental outcomes are measured and modeled using best in class sampling techniques and process-based modeling.	A combination of soil sampling and carbon modeling.
Practice Verification	Satellite imagery is used to verify cover crops, crop rotation and tillage. Application maps, receipts, and other evidence as available are used to verify N-application.	On farm verification for a small percentage of farmers each year. Gradable cover all sampling and verification costs.	3rd party verification, organized and paid for by Truterra.
Data Collected on Enrollment	Crop rotation, cover cropping, and tillage type, field boundaries, and N-applied for the growing season for which the grower is enrolling.	Crop production data including planting, applications, practice information (e.g., cover cropping and tillage), and harvest.	Field management data including planting, fertility, in-season applications, harvest, cover crop and tillage information.
Penalty for Temporary Break in Practice Implementation	None. The grower would not generate credits for that practice for that year.	Evaluated on a case-by-case basis. In some instances, credit generation and future program participation could be impacted.	Will vary based on program offering, some program flexibility to accommodate a reasonable number of naturally occurring variances and extreme weather events.
Technical / Agronomic Assistance	Technical software support provided during the enrollment process. Agronomic recommendations not provided.	Gradable Plan starts at \$3.50/acre and provides soil sampling and agronomy support to help farmers plan their crop nutrition needs for each growing season.	One-on-one technical assistance and support.