

How Voluntary Carbon Payment Programs Entrench Big Ag

With so much interest and growth in carbon-offset credits, start-up and legacy businesses alike are finding different ways to get in on the green rush. In addition to carbon-credit certifiers and exchanges, brokers of all sorts are stepping in to help farmers turn their agricultural practices into sellable carbon offsets. Navigating carbon-offset measurement and certification can be incredibly complex and costly for farmers to take on independently. Most farmers generate carbon-offset credits with or on behalf of a third-party business, such as Indigo Ag, that estimates farmers' tons of carbon sequestration, works with a certifier to turn those estimates into sellable carbon offsets, and typically markets those credits for farmers as well.

High-profile carbon-farming start-ups, including Indigo Ag and Nori, have garnered most of the media attention for recruiting and paying farmers to generate carbon offsets. But dominant agribusiness corporations such as Bayer, Corteva, Nutrien, Land o' Lakes, and Cargill have all launched different types of carbon payment programs, too. **[See sidebars, pages 9-11, for more details on these programs.]** These companies can leverage their large customer base and dominance in key agricultural markets to quickly gain a leading position in the new carbon- payment market (or pick winners and losers by partnering with start-ups, as Corteva has with Indigo).

Corporations say that they're launching these programs to do their part to fight climate change, but cornering the position between farmers and carbon-offset marketing holds significant benefits for their larger enterprise. Carbon-sequestration verification programs allow agribusinesses to collect more detailed agronomic data and drive new users to their digital agriculture platforms and products. New volumes of farm-level data also help corporations target farmers

BAYER'S CARBON PROGRAM



Bayer is one of the most influential agrichemical and seed companies in the world following its 2016 acquisition of Monsanto. As just one example, Bayer acquired Monsanto's patented genetically engineered traits found in more than 65% of all U.S. soybean seeds and 80% of all U.S. cotton seed.⁵⁸ In addition to selling seeds, seed traits, and agrichemicals, Bayer has made big investments in the nascent digital agriculture industry,⁵⁹ in part to acquire more information about farmers and levy greater influence over their management decisions. In Monsanto's 2013 annual report, the company pointed to a lack of farm-level data as holding back profits.⁶⁰ That same year, Monsanto announced its \$930 million acquisition of the Climate Corporation, one of the most advanced data analytics companies in agriculture.⁶¹ One of Climate Corporation's central products is Climate FieldView.

Climate FieldView is a digital agriculture platform that farmers use to acquire various digital agriculture software programs that can monitor and record climatic data, soil conditions, and management practices to make farming recommendations. Data are collected from farm equipment synced to the platform and from the information uploaded by farmers.⁶² Over 180 million acres of farmland globally are enrolled in Climate FieldView, and Bayer's new carbon program could bring in even more.⁶³

In 2020, Bayer launched a carbon market program through FieldView, now called ForGround.⁶⁴ Farmers in ForGround are paid for every acre on which they adopt a carbon sequestering practice, rather than per ton of carbon sequestered.⁶⁵ In the program's latest iteration, prices vary by state but generally farmers earn \$5-\$6 per acre annually for no-till or strip-till agriculture, and \$6 per acre per year for cover cropping.⁶⁶ In the program's pilot, farmers could also earn credits to buy Bayer products instead of cash.⁶⁷ As of 2023 farmers that enroll receive a free subscription to FieldView Plus.⁶⁸ Farmers sign contracts to adopt these practices, at Bayer's specifications, for 10 years with an additional 10-year retention period after the contract ends.⁶⁹ The program is currently available in 17 states.⁷⁰

When Bayer promotes its program there is an unspoken assumption that the revenue to pay farmers for adopting these practices comes from Bayer's sale of the carbon credits that farmers generate. But at a House agriculture committee hearing in September, 2021 a Bayer representative, Leo Bastos, couldn't give a straight answer to this basic question about where the money to pay for its carbon program will come from. Rather than sell credits immediately, Bayer may choose to hold onto carbon credits to make corporate sustainability claims or sell them later if credit prices rise. This raises questions about whether farmers are receiving a fair value for their work to generate credits, since Bayer's payment plan is not directly tied to credit sales (Indigo, by comparison, pays farmers in a portion of their carbon credit sales). At the 2021 hearing, Bastos also stated that their contracts allow for farmers to receive a larger payout if carbon credit values rise. "As prices increase, we actually share more of that value back to the farmer," Bastos said. Nonetheless, this arrangement still gives Bayer the power to set payment prices to farmers, especially when there is scant price transparency or price discovery in carbon offset transactions to begin with.

with advertising or get an informational advantage in commodity trading. Carbon-credit contracts also lock farmers into a discrete set of agricultural practices, often dictated by the carbon-payment program, allowing seed and agrichemical corporations to define climate-smart farming and preference their products in the process.

LETTING BIG AG DEFINE CARBON-SMART FARMING

Proponents of the voluntary, carbon-payment-and-credit-trading programs argue that pushing conventional farmers to adopt more environmentally sustainable practices is in the public interest, whether the directive comes from an agribusiness or a public body. However, the corporate entity is not designed to act in the public interest.³⁹ Unlike public officials, who are accountable to the public, corporations have a fiduciary duty to maximize shareholder profits.⁴⁰

Studies show that agroecological management and agroforestry have far greater climate benefits than implementing isolated practices like cover-cropping or no-till agriculture on conventional, mono-crop farms.⁴¹ Despite this, carbon-market platforms across the board prescribe isolated practices, predominantly reduced tillage, reduced nitrogen fertilizer use, cover-cropping, and in the case of livestock, installing methane digesters on industrial livestock operations.

One explanation for this approach is simplicity: requiring discrete practices is simpler than asking farmers to take a whole-ecosystem approach to agricultural management. These practices are also minimally disruptive to, and in many cases further, the industrial agricultural systems that are core to the business models of corporations such as Bayer and Cargill. Genetically engineered seed and agrichemical manufacturers have every incentive to recommend carbon-sequestering methods that push their product sales over more holistic agroecological management.

CARGILL'S CARBON PROGRAM



Cargill is the one of the largest private companies in the world, ranked second in the United States after Koch Industries.⁷¹ Cargill trades commodities ranging from soy to steel and runs slaughterhouses around the world. Cargill rose to dominance, in part, by developing extensive information gathering and sharing systems for superior market intelligence and commodity trading.⁷² Today, Cargill says data analytics is still an essential part of how it does business, the corporation even makes revenue selling proprietary datasets and intelligence. Carbon payment programs present another way for Cargill to gather farm-level information and trade in carbon offsets as a new commodity.

Cargill's carbon program, called "RegenConnect" operates through a partnership with Regrow, a data analytics and soil modeling company. Farmers must have a Cargill customer number to participate.⁷³ Farmers upload four years of historical agronomic data to Regrow's FluroSense platform.⁷⁴ Farmers then agree to implement a practice prescribed by Regrow: cover cropping, reducing fertilizer use, or no-till. Farm-level data are uploaded throughout the program and supplemented by data collected through a satellite system.

Regrow calculates total carbon sequestration with a computer model called a DeNitrification- DeComposition Model (DNDC). The DNDC's algorithm simulates soil microbial processes to "digitally recreate the effects of farming practices on soil health."⁷⁵ DNDC requires data on soil pH; soil carbon; bulk density; soil texture; cropping areas and rotations; daily weather; and management practices including fertilizer use, planting and harvest dates, tillage, and watering.⁷⁶

Regrow's platform also collects run-of-mill personal data on farmers, including site traffic data and credit card information.⁷⁷ Regrow's privacy policy also includes a catch-all provision: Regrow can collect "Any other personal information that may be required in order to facilitate [a participant's] dealings with [Regrow]."⁷⁸ The privacy policy allows Regrow to acquire these data directly or through third parties. However, a representative from Regrow said that their privacy policy only allows for information collected from farmers to be used for improving their product and verifying carbon sequestration and other environmental outcomes. Regrow also said that they only share anonymized farmer data with Cargill that is pertinent to the RegenConnect partnership.

While Climate FieldView allows participants to remove data,⁷⁹ other platforms require that the data are permanently relinquished. Regrow's privacy policy grants the FluroSense platform "a royalty-free, worldwide, irrevocable and perpetual license to use, reproduce, copy, de-identify and categorize [participant's] Data."⁸⁰

Cargill's program is currently available to farmers in fifteen states.⁸¹ For the last two growing seasons Cargill offered one year contracts for generating carbon offsets, though Cargill's website suggests that they are looking for long-term partnerships.⁸² For the 2022-2023 crop season, Cargill is offering farmers \$25 per ton of sequestered carbon per acre.⁸³ The company plans to use these carbon credits to meet internal corporate greenhouse gas reduction goals and sell them to "downstream customers," such as grain and beef buyers.⁸⁴

For example, Bayer is a strong proponent of implementing no-till agriculture and using cover crops. These two practices form the foundation of its Carbon Initiative. Perhaps most concerning about this model from an environmental perspective is the heavy use of glyphosate, the main ingredient in Roundup,™ to make these practices work for industrial monocultures.⁴²

While organic operations can deploy no-till and cover crops without relying on synthetic herbicides, conventional monoculture operations cannot. At a large scale, herbicides are the most efficient way to “knock down” cover crops when it’s time to plant the cash crop, and companies like Bayer are happy to provide the necessary glyphosate-based herbicides.

Multiple studies have found that using glyphosate harms important fungi, earthworms, and other invertebrates that are essential to a healthy soil ecosystem.⁴³ Focusing entirely on practices like no-till at industrial scales in order to generate carbon credits will not only increase sales of chemicals tied to biodiversity collapse and human health concerns, but it may also come at the cost of building healthy soils that can sequester carbon and provide a number of other ecosystem benefits in the long term.⁴⁴

These types of carbon payments also further marginalize truly sustainable farms. Gearing carbon-payment programs towards larger, monoculture, and chemical-intensive farms give them another revenue stream and advantage over smaller and diversified farms with proven environmental benefits. As currently designed, carbon payments act as another low-value commodity for which economies of scale are necessary to capture the benefits. Only farms operating hundreds or thousands of acres can generate enough credits to offset the current costs of implementation and verification.⁴⁵ For example, in 2020, the average farm selling carbon credits to Indigo operated 1,300 acres and grew commodity grains or cotton.⁴⁶

CORTEVA'S CARBON INITIATIVE WITH INDIGO AG



Corteva is the seeds and agrichemical spinoff of DowDupont, a chemical conglomerate that split itself into three corporations in 2019. Corteva competes with Bayer as one of the two largest crop input corporations globally. Corteva also operates a digital agriculture platform called Granular Insights. In August 2021 Corteva announced an expansion of its Carbon Initiative program including a partnership with Indigo Ag, a leading carbon trading start up.

Indigo is a growing corporation that began selling microbial seed treatments and branched out into digital agriculture products and data-driven grain marketing. The corporation now runs one of the top platforms for measuring agricultural carbon sequestration and marketing carbon offsets to corporate buyers.

Just as Cargill partners with ReGrow to measure and verify carbon sequestration, Corteva partners with Indigo. One key difference is that Corteva collects farmers' carbon quantifying information through the corporation's Granular Insights platform, which then shares the data with Indigo for certification and credit generation. Indigo quantifies tons of sequestered carbon using a combination of modeling, based on farmer-provided data, and select soil sampling. Indigo will then sell these credits through their “buyer network.” More than a dozen corporations including The North Face, Barclays, Shopify, and Fat Tire brewing have signed up to purchase Indigo's agricultural carbon credits.

Corteva guarantees farmers that generate credits for Indigo through Granular Insights a minimum of \$20 per credit or 75% of their carbon credits' sales value.⁴⁵ Corteva projects that credits will sell for \$30 per credit in the 2022 crop year and \$60 per credit by 2030.⁴⁶ Participating farmers sign a five-year contract and share three to five years of historical farm data to enroll.⁴⁷ The program is available in 28 states.

COMPOUNDING MONOPOLY POWER THROUGH DATA ACQUISITION AND BUNDLING

As agriculture becomes increasingly mechanized and technology-dependent, the tools that digitally collect, store, and analyze farm data are an integral aspect of large-scale agriculture.⁴⁷ Leading agribusinesses, especially seed and chemical manufacturers, are clamoring to develop a dominant digital platform through which farmers access agriculture software and data-driven farm management insights.

Capturing large volumes of farm-level data has become an increasingly important competitive advantage in this

arena. Once captured and analyzed, data can bring tailored agronomic insights to every level of decision-making on the farm. These insights run on machine learning, whose predictions improve with larger and more diverse datasets.⁴⁸ Because verifying carbon sequestration requires copious amounts of detailed information from farmers, carbon-payment programs introduce a new way for dominant corporations to expand their data advantage and draw new users onto their digital agriculture platforms. As Bayer, Corteva, and Cargill expand their data advantage by collecting more information on more farm acres through carbon-offset programs, their market dominance will only deepen.

When seed and chemical companies control the software that advises farmers on planting decisions, they also have new opportunities to engage in predatory business practices. In a 2017 letter, the American Antitrust Institute and Food & Water Watch warned that the Bayer-Monsanto merger would allow the newly formed company to combine not just their seed and chemical products, but digital agriculture products and farmer data sets. They said the merger would allow the company to “leverage[] critical information. . . to bundle traits, seeds and chemicals into exclusive, proprietary packages,”⁴⁹ much as these corporations have already done with patented herbicide and herbicide-resistant seed pairs. For instance, an early version of Monsanto’s digital agriculture platform, FieldScripts, *only* offered Monsanto brand seeds on the platform.⁵⁰ Today, Bayer offers a free year of premium Climate FieldView when bundled with its seeds and chemical through a rewards program, “Bayer PLUS Rewards.”⁵¹ Carbon program participants receive premium FieldView for free.⁵²

Bayer has found that FieldView users buy more Bayer products. According to a 2022 presentation, Bayer generated more than 5% higher sales from its corn seed customers who had FieldView Plus compared to non-FieldView Plus users. Bayer also found that FieldView users planted Bayer corn seeds at a 2.5% higher seeding rate than the national average.⁵³

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LONG-TERM CONTRACTS LIMIT FARMER AUTONOMY AND TIE THEM TO A NEW, VOLATILE "COMMODITY"

Just one year of tilling can release much of the carbon stored in soil. Due to these concerns around soil carbon permanence, many carbon-payment programs require that farmers make a long-term commitment to change their practices. But such agreements introduce considerable power imbalances, especially when made with monopolistic corporations. Farmers agree to adopt new fixed costs for five or 10 years at a time when the promised benefit of a carbon payment is wildly uncertain. For example, the contracts in Bayer’s Carbon Program last for 10 years, plus an additional 10-year “retention period” during which farmers must maintain their new practices to ensure long-term carbon sequestration.⁵⁴ This effectively commits farmers to 20 years of new fixed costs (which can be as much as \$35 per acre in the case of cover crop) but only 10 years of guaranteed pay.³¹ Although Bayer claims that farmers can leave the contracts at any time “with no penalty,” their exact terms of termination are not public and they emphasize that farmers cannot remove a portion of their fields and add them back in.⁵⁵

While most analysts predict that the value of agriculture carbon offsets will increase, some remember the promise and crash of the Chicago Climate Exchange, through which some farmers signed five-year carbon credit contracts only for the price of carbon to drop from \$7 per ton to 3¢ per ton. Farmers narrowly avoided years of money-losing contracts because the Exchange

itself evaporated. While Bayer, Cargill, and Corteva all offer minimum price payments, there's no telling how terms could change should prices collapse.

As previously discussed, a major issue with valuing carbon credits is the lack of standardization and credibility. Even though carbon-measurement technology has somewhat improved since 2012, standardization and credit trustworthiness have not. Carbon offsets are still incredibly volatile with questionable underlying value and little in the way of transparent price discovery. Credit values vary dramatically depending on their perceived credibility. Financial instruments based on commodities with potentially no value nor true price discovery introduce systemic financial risks that only benefit financial speculators.⁵⁶

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