

Carbon Farming may Lose its Lustre for CO2 Reduction

As the search for ways to reduce carbon dioxide (CO₂) in the atmosphere intensified in recent years, farmers have been told that they can earn thousands of dollars by storing CO₂ in the soil. New studies have, however, called that “carbon farming” into question. Farmers need to consider carefully whether they will start carbon farming.

Carbon Farming is Lucrative

The concept of carbon farming is relatively straightforward. The idea is to use crops to take carbon dioxide out of the air by moving it underground through root systems, *Wired* magazine explained. Photosynthesis pulls CO₂ from the air and converts it into sugars stored in leaves, stalks, roots or soil, according to the MIT Technology Review. The hope is that farmers can increase the amount of carbon in their fields through practices such as planting cover crops between harvests or drilling seeds in instead of tilling the soil.

Farmers are already making money based on the concept. Maryland farmer Trey Hill received about US\$120,000 for sequestering 8,000 tons of carbon over a three-year period on his 2,500-acre farm, according to *Lancaster Farming*. And Iowa farmer Kelly Garrett raked in nearly US\$150,000 after signing up with Nori to capture carbon in his soil, according to *Grist*. The Agoro Carbon Alliance said a 3,000-acre grower with corn and soy rotation in the US can earn US\$89 per acre by shifting from conventional tillage to no-till, planting rye cover crops and using nitrogen efficiency practices.

Companies such as Nori and Indigo get the money for these payments by selling carbon credits to companies and other organisations that want to offset their carbon-emitting activities. The result is that farmers who increase soil carbon and reduce emissions on their farms can earn plenty. One buyer is global agricultural giant Cargill, for example, which said it supports such activities by encouraging farmers to participate in programmes as a way of helping reduce CO₂ emissions and by buying carbon credits.

Reinforcing the positive impact of the practices, CNBC reported that experts estimate farmers across the world could draw down 10 percent of the carbon already in the atmosphere and sequester enough carbon to avert the worst impacts of climate change. Ohio State University soil scientist Rattan Lal estimates that changes in farming and soil management practices could coax up to two-thirds of all carbon lost from soils back underground. And the National Academies of Sciences, Engineering and Medicine estimated in 2018 that “negative emissions technologies” such as soil sequestration could remove 250 million metric tons of CO₂ per year in the United States alone.

New Studies Cast Doubt

The hype and rosy forecasts have led more researchers to study how and whether carbon farming actually works. Unfortunately, the results are not as positive as many had hoped.

The MIT Technology Review, for instance, bluntly said that there is little evidence that carbon farming works as well as promised. While farmlands do have the capacity to store billions of tons of carbon dioxide in the soil, there is still uncertainty about which techniques work across different soil types, depths and climate conditions.

The World Resources Institute similarly concluded, according to *Wired*, that even though regenerative methods were good for soil health, there is “uncertainty about whether regenerative practices actually sequester extra carbon.” Any carbon captured in the soil would be released back into the atmosphere if the soil were disturbed, which may well happen because most farmers who practice no-till farming still till their soil at least every few years.

A key issue, researchers at the University of California at Davis found, is that even though cover cropping increases carbon in the 12 inches (30 cm) on the surface, the soil can lose significant amounts of carbon below that depth. Whereas most carbon studies look at the top-most layer of cropland soils and show increased carbon from strategies such as cover cropping and no-till farming, Friends of the Mississippi River added, new studies show

that these practices may simply redistribute carbon in the soil rather than storing it. Indeed, standard soil health and nutrient management practices may have the unintended effect of enhancing soil microbial activity, which could release much of the crops' deposited carbon back into the atmosphere. "Despite the many benefits that these practices offer for water quality, flood resilience and wildlife habitat, greenhouse gas storage in soils may be more limited and temporary than initially hoped."

Moreover, Stanford University professor Rob Jackson said that widely used climate projections likely overestimate the potential of land to draw down CO₂ from the atmosphere because they don't account for how higher carbon dioxide levels that increase plant growth and biomass result in a decrease in soil carbon storage.

The net result, climate media firm Greenbiz opined, is that a growing number of scientists worry that mounting societal pressure to do something to counter climate change is pushing money into carbon farming before the science needed to underpin it is mature.

While carbon farming sounds positive, it may not actually achieve its intended result. Even more concerning, farmers who receive money from carbon credits could face risks in the longer term if they till their soil or if current practices change. Clearly, more research is needed before more farmers pile into carbon farming.