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Carbon credits and conservation practices

Mahdi Al-Kaisi

Iowa State University, malkaisi@iastate.edu

H. Mark Hanna

Iowa State University, hmhanna@iastate.edu

Michael Tidman

Iowa State University

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Abstract

Carbon and the 'carbon cycle'. Over the past century, CO₂ levels have risen significantly. There is considerable debate about the reasons -- whether it's a natural cycle or the result of increased CO₂ emissions due to human activities-- but there is general agreement that human activity accounts for part of the increase, especially in view of the continuing increase of CO₂ levels following the on-set of the industrial age. There is a great amount of research regarding the benefits of organic matter or soil carbon in improving soil quality and the sustainability of balanced agriculture productivity.

Keywords

Agronomy, Agricultural and Biosystems Engineering

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Bioresource and Agricultural Engineering

INTEGRATED CROP MANAGEMENT

A photograph of a person in a field, possibly a farmer, with the text 'INTEGRATED CROP MANAGEMENT' overlaid in large, bold, serif font. The text is white with a dark outline, and the background is a blurred image of a field with a person in the distance.

Carbon credits and conservation practices

Carbon and the 'carbon cycle'. Over the past century, CO₂ levels have risen significantly. There is considerable debate about the reasons -- whether it's a natural cycle or the result of increased CO₂ emissions due to human activities-- but there is general agreement that human activity accounts for part of the increase, especially in view of the continuing increase of CO₂ levels following the on-set of the industrial age. There is a great amount of research regarding the benefits of organic matter or soil carbon in improving soil quality and the sustainability of balanced agriculture productivity.

Agriculture in general and Iowa producers in particular can help reduce the level of CO₂ in the atmosphere through the adoption of wide range of conservation practices. Such practices play significant role in capturing and storing CO₂ in soil and vegetation. This process is termed 'carbon sequestration'. What's more, Iowa producers who do so could benefit by selling carbon credits, and profit from the implementation of conservation practices that promote carbon sequestration on farms.

What are carbon credits?

It is new concept devised by public and private entities. The concept involves buying carbon units, mainly in tons, through a middle entity that aggregates contracts from many farmers who meet the criteria of carbon sequestration through adoption of a range of conservation practices. The carbon units are then sold to a buyer in the industrial sector needing to offset the CO₂ generated to the atmosphere through their manufacturing activities. The process by which agriculture practices can mitigate atmospheric CO₂ include:

First, CO₂ can be diverted to secure storage in plant material -- more plants equals more carbon stored. Second, is to decrease organic carbon mineralization -- which is managing crops and soil to restrict conditions that accelerate the oxidation of soil organic matter and leading to the release of CO₂ such as is the situation with conventional tillage. Third, since eroded soil is exposed soil -- and exposed carbon -- reduction of soil erosion will keep carbon trapped in the soil.

Using farming practices that result in any or all of the three ways to sequester carbon could earn carbon credits -- the medium of exchange in the carbon sequestration market.

Carbon credits could benefit Iowa producers

Consumers of fossil fuels such as utilities, and industries, are assigned CO₂ emission limits, but since updates of physical facilities and equipment or rebuilding new plants may be too costly, they are allowed to pay others to store carbon in exchange for the right to release CO₂ in excess of their limits into the atmosphere.

In Iowa, soils used for agricultural production could become a massive net 'carbon sink,' and a viable entity in the carbon credit market. Farm practices that sequester carbon -- no-till, vegetated buffers, withdrawal of cropland from production, reforestation, management of timberland, and abatement of methane from livestock waste -- might all earn money as utilities and industries pay for those practices by purchasing the resulting carbon credits.

What producers should be thinking about

With carbon sequestration and carbon credits, Iowa producers may well have had an entirely new 'product' for their farm operations, adding another opportunity to find direct profitability or value added practices for their conservation effort. But what's even better is that carbon sequestration could help to enhance the soil quality of farmland. As management evolves to meet the requirements needed to earn carbon credits, success might appear in several ways.

Soil organic matter can improve soil structure and soil physical and chemical properties. Soil organic matter benefits can include the promotion of beneficial soil organisms, which will increase in vigor and numbers with more diverse crop rotations and higher organic matter levels. Organic matter may also bind pesticides, suppress disease organisms and improve crop health and vigor as soil biological activity and diversity increase.

The concept of carbon sequestration is real

The carbon sequestration market provides Iowa producers with an opportunity to not only improve their bottom line but also improve environmental quality and long-term sustainability. But they should learn more about the issue before entering into any agreements.

For more detailed information about carbon sequestration, visit the Iowa State University Agronomy Extension Web site at <http://extension.agron.iastate.edu/> and check the Soil Management page. In addition Iowa State University Extension publication Impact of Tillage and Crop Rotation Systems on Soil Carbon Sequestration (PM 1871), is available at: <http://www.extension.iastate.edu/pubs/Masterlist4.html#1800>.

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