Carbon Markets for US Row Crop Producers: Opportunities and Challenges

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Emissions are divided into 3 “scopes”

- **Scope 1**: Direct emissions from company-owned assets (facilities, vehicles)
- **Scope 2**: Indirect emissions from purchased energy
- **Scope 3**: Indirect emissions from upstream suppliers, employee commuting, etc.

- These are mostly the emissions covered in the offset markets we’ll discuss later
Carbon markets: principle and practice

- A basic regulatory market
  - Regulatory authority caps emissions from some industry
  - Regulator issues permits, 1 permit = 1 unit of emissions
  - Regulated polluters meet emissions cap by either
    1. Abating pollution to match permit stock
    2. Buying permits from others
    3. Buying “offsets” from unregulated sources outside market
Regulatory markets

- Chicago Climate Exchange (defunct 2010)
  - Voluntary, legally-binding market
- Regional Greenhouse Gas Initiative (2009-present)
  - Mandatory market for power plants in NE and Mid-Atlantic
- California Cap-and-Trade Program (2013-present)
  - Mandatory for electricity producers, large industrial sources, and fuel distributors
Carbon markets: principle and practice

- A basic nonregulatory offset market

  - Unregulated firms want to voluntarily mitigate emissions
  
  - Firms pay for offset projects or buy offsets from third party aggregators
Carbon markets: principle and practice

- Nonregulatory/offset markets
  - Indigo Ag
  - Nori, Inc.
  - Bayer Crop Sciences

  ✓ This is an “inset” market – like an “offset” market, but scope of offset sales restricted to firm’s own supply chain
  - Climate Trust

Only markets to date that deal with row crop ag
- Over half of US cropland acres are already in
  - No-till (104 mil. acres, 26%)
  - Other conservation tillage (98 mil. acres, 25%)
- If all US cropland acres planted in no-till
  - Sequester 123 million MT of carbon/year
  - 2% of all US CO₂ emissions

Source: 2017 US Census of Agriculture
• Only 4% of US cropland acres are planted in cover crops
• If all US cropland acres planted in cover crops
  • Sequester 147 million MT of carbon/year
  • 3% of all US CO₂ emissions

Source: 2017 US Census of Agriculture
Farmer awareness, engagement, and participation in carbon management

Are you aware of any opportunities to receive payments for capturing carbon on your farm? 736

Have you actively engaged in discussions regarding receiving payments for capturing carbon on your farm? 465

Have you signed a contract to capture carbon on your farm? 380

Source: Purdue University-CME Group Ag Economy Barometer, February, March, and April 2021 Surveys
Why are farmers choosing not to participate in carbon markets?

- Payment Level Offered: 64%
- Legal Liability of Contract Noncompliance: 38%
- Other: 31%
- Skepticism of Carbon Sequestration Viability: 29%
- Previous use of Eligible Practices: 22%
- Receipt of State or Federal Conservation Funding: 0%

Source: Purdue University-CME Group Ag Economy Barometer, March and April 2021 Surveys
How much will I get paid?

- Price is determined by supply and demand
  - Supply is lagging demand
  - Is demand sustainable?

- Current prices seem to be in the range of $10-$20/MT of carbon
  - $40/acre est’d. cost to switch from conv. till to no-till
  - If 0.5 MT/acre sequestered, then $80/MT carbon would be needed to offset costs

Source: Purdue University-CME Group Ag Economy Barometer, March and April 2021 Surveys
What are my contractual obligations to continue the practice?

- Soil carbon sequestration is reversible
  - Example – tillage to eliminate field ruts, weeds, etc.
  - How would carbon contracts handle these situations?

- How long are contracts?
  - 1-20 years
  - Australia's Emissions Reduction Fund – 100-year contracts
    - 25-year contracts available, but at reduced rate
Do I qualify if I am already using eligible production practices?

- Generally, no.
  - Some opportunities for short “lookback” payments from some firms
  - Typically, less than 5-year “lookback”

- Soil carbon sequestration potential
  - Increasing at a decreasing rate
  - But ultimately, it is finite

Source: Thamo and Pannell (2016)
• Companies generally pay for verification

• But they do not sample every acre
  ✓ Heavy reliance on biogeochemical modeling, based on a combination of sampling and production practices
Can I store carbon on leased acres?

- Generally, yes.
  - Need to show management control
  - Need landowner approval to sell carbon credits

- Questions remaining
  - How is continuity of carbon sequestration ensured?
  - Current contracts are with farm operator, what happens when cropland changes hands either via change in ownership or lease?
  - Contract enforcement issues
Alternatives and consequences

1. Private carbon markets continue to dominate
   • Reliant on investors and/or consumers demanding a reduction in firms’ carbon footprint
   • Existence of private markets is driving opportunity for row-crop agriculture to benefit from carbon sequestration
   • But, questions regarding quality of soil carbon credits likely remain
2. Government gets involved

• Standardize measurement and verification
  ▪ Could set the stage for carbon offsets from row-crop agriculture to be used in regulated carbon market
  ▪ Make information publicly available, similar to role of USDA-AMS

• Tax or cap on carbon emissions
  ▪ Ensures that there would be a demand for carbon offset
Thank you!

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Visit www.purdue.edu/commercialag for a white paper and webinar on carbon markets.