Ecosystem Markets

Opportunities, Challenges, Best Practices

NALN Soil Health Stewards | 09/10/2021

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Background - What are ecosystem markets?

- Driven by consumer demand.
- Payments to protect, restore or mitigate for impacts to ecosystems.
- Practices are often part of traditional state and federal incentive programs.
- Market payments are generated via outcomes verified at the field level and are not necessarily practice-specific.
- Markets exist for carbon sequestration, GHG reductions, water quality and others.

https://ilsustainableag.org/ecomarkets/
Carbon Offsets

Measurable reduction of GHG emissions from an activity or project

Used to compensate for emissions occurring elsewhere

Typically measured in metric tonnes (2,205 lbs) CO2e

Includes CO2, methane, N2O
In total there are nearly 400 million acres of cropland in the U.S., the country has an enormous opportunity to rebuild soil organic carbon (SOC), sequester atmospheric carbon, and reduce greenhouse gas (GHG) emissions.
How much carbon can my farm store?

IT DEPENDS!

- Farm and field level characteristics and management including soil type, climate, topography, crop rotation and productivity, residue and nutrient management.
- No-till specific management including depth of previous tillage practices
- Cover crop specific management including number of sequential years planting a cover crop, how long the cover crop is grown before termination, and cover crop species.

<table>
<thead>
<tr>
<th>PRACTICE</th>
<th>NATIONAL RANGE (AVG.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-till (NT)</td>
<td>0.03 – 1.07 (0.49)</td>
</tr>
<tr>
<td>Cover Crops (CC)</td>
<td>-0.03 – 1.50 (0.37)</td>
</tr>
</tbody>
</table>

NT: The largest SOC increases are associated with temperate locations and well-drained soils.

CC: The largest SOC increases are associated with temperate locations, fine-textured soils, and mixed species plantings of cover crops.

Converting Intensively Tilled Acres to No-Till or Strip Till

State-weighted average emission reduction coefficients (tonnes CO2e ac-1 y-1) with adoption of no-till or strip-till practices on acres formerly under intensive tillage. Weighted emission reduction coefficients generated using The CaRPE Tool, version 2.03. Values are scaled to the state level and reflect average ERs across all counties and weighted for cropland acres. They are intended for comparative purposes only.

State-weighted emission reduction coefficient

# tonnes CO2e / ac / yr

OH = 0.64
PA = 0.52
MD = 0.51

https://farmlandinfo.org/publications/combating-climate-change-on-us-cropland/
Adopting Non-Legume Cover Crops on Acres Previously Without Cover Crops

State-weighted average emission reduction coefficients (tonnes CO2e/acre/year) with adoption of non-legume cover crops with 25% fertilizer nitrogen reduced. Weighted emission reduction coefficients generated using The CaRPE Tool, version 2.03. Values are scaled to the state level and reflect average ERCs across all counties and weighted for cropland acres. They are intended for comparative purposes only.

https://farmlandinfo.org/publications/combating-climate-change-on-us-cropland/

Recap of CO2e Potential

There is general consensus around the range of GHG reduction potentials for several cropland management practices (previous modeling studies and meta-analyses)

There are nearly 400 million acres of cropland in the U.S., presenting farmers with an unparalleled opportunity to increase soil carbon sequestration and reduce greenhouse gas emissions while improving water quality and building on-farm resiliency and profitability.

Caveats

- Research on surface soils
- Deep profile storage potential?
- Practice permanence
Market Entities

**Nori** – In pilot phase, project enrollment is currently available nationwide. Two projects have sold and received payment for ~30,000 credits to date.

**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.

**Soil and Water Outcomes Fund** – Project enrollment currently available in select counties in Iowa, Illinois, and Ohio. Planning to expand to additional geographies in 2022.

**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.

Input Providers

**Bayer US Carbon Program** – $3 per acre per year for No-till and strip-till, $6 per acre per year for cover crop adoption

**Corteva Carbon Initiative** – Leverages Granular insights to assist farmers in earning an estimated $5-20 per acre for cover crops and reduced tillage.

**Nutrien’s Carbon Program** – Currently testing several pilot projects to provide incentive payments for climate smart practice implementation or carbon and water outcomes.
**Data Platforms**

- **CIBO**—Offers carbon sellers and buyers an innovative, efficient carbon market by calculating the regenerative potential.

- **FBN/Gradable**—Provides new technology and services that facilitate the scoring, sourcing and pricing of low-carbon grain.

- **Truterra TruCarbon**—Helps growers measure and track their on-farm stewardship journey via the Truterra Insights Engine.

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**Recap on Market Opportunities**

There are multiple entities with ecosystem-related programs: diverse players, variety of incentives, varied payment structures, and different levels of technical support.

**Caveats**

- Rapidly changing landscape
- Pilot phase vs full roll-out
- New partnerships forming
Which program is right for me?

<table>
<thead>
<tr>
<th></th>
<th>Ohio</th>
<th>Pennsylvania</th>
<th>Maryland</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No-till</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tonnes CO₂e</td>
<td>0.64</td>
<td>0.52</td>
<td>0.51</td>
</tr>
<tr>
<td>Payment(^{(1)})</td>
<td>$ 9.60</td>
<td>$ 7.80</td>
<td>$ 7.65</td>
</tr>
<tr>
<td>EQIP(^{(2)})</td>
<td>$ 15.39</td>
<td>$ 18.02</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Cover Crop</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>tonnes CO₂e</td>
<td>0.29</td>
<td>0.16</td>
<td>0.28</td>
</tr>
<tr>
<td>Payment(^{(1)})</td>
<td>$ 4.35</td>
<td>$ 2.40</td>
<td>$ 4.20</td>
</tr>
<tr>
<td>EQIP(^{(2)})</td>
<td>$ 34.25</td>
<td>$ 54.17</td>
<td>$ 51.86</td>
</tr>
</tbody>
</table>

Values are per acre basis

(1) Average payment ~ $15 / tonne of CO₂e
(2) 2021 EQIP Payment Schedules

*Back of envelope calculation for demonstration purpose only -- not intended to represent individual farm income*

Take Away

Market incentives alone are not the most cost-effective means to accelerate practice adoption

- Not sufficient to justify management changes
- Not competitive with existing financial incentives

- May be right for a farmer already planning to change
- Increased ROI when payments are stacked
Advice for Farmers

Read the Fine Print!

- Does enrollment in carbon market limit eligibility for other financial incentives?
- Contract length - is there a penalty for breaking contract early?
- Are rented lands eligible – how are programs structured?
- Price stability / caps – payment schedules and
- Privacy / data management should be transparent
- Verification / hidden fees – costs for third party verification?
Resources to help you...

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With Gratitude

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