How Carbon Sampling Differs from Fertility Sampling

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Topics Covered:

- Why map soil carbon?
- How to map soil?
How Carbon Sampling Differs from Fertility Sampling

Fertility Sampling:

Carbon Sampling:
How Carbon Sampling Differs from Fertility Sampling

“You can’t manage what you don’t measure”

Peter Drucker
How Carbon Sampling Differs from Fertility Sampling

monetize

“You can’t manage what you don’t measure”

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Peter Drucker
Carbon Buyers
Policy Makers
Farmers
Carbon variability within 2.5 acre grids (% OM).
(10 samples per 2.5 acres)

**The challenge:**
The increase in carbon over 10 years is small—perhaps from 2% carbon to 2.5% carbon. (6” sample.)

There is much more carbon variability within short distances than the expected change.
Soil Variability Impacts Farmers Around the World
Plenty of hype around soil carbon. Does this all sound too good to be true? How could agriculture miss out?

Uncertainty: how confident will carbon buyers be that soil carbon was truly increased?

Margin of error...Confidence Interval

This is where in-field measurements will play a key role...
Why map soil carbon? Keep agriculture from missing this opportunity

“within the margin of error”

- Increasing the number of samples improves the confidence interval
- Soil sensors increase the sample number cost-effectively
Why map soil carbon? Increased Revenue

“within the margin of error”

- Increasing the number of samples improves the confidence interval
- Soil sensors increase the sample number cost-effectively
Veris participated in a soil carbon research project that measured soil carbon changes on long-term tillage trials across 5 states.
University of Nebraska, Lincoln
Long Term Tillage Studies (10 yrs+)

Corn-Soybean: Conventional Tillage

Corn-Soybean: No-till 10 years

Corn-Corn: No-till 10 years
(similar C to corn-soy no-till w cover crops)
University of Nebraska, Lincoln
Long Term Tillage Studies (10 yrs+)

Corn-Soybean: Conventional Tillage
University of Nebraska, Lincoln
Long Term Tillage Studies (10 yrs+)

Corn-Soybean: No-till 10 years
+3.76 tons C/ac

Corn-Corn: No-till 10 years
(similar C to corn-soy no-till w cover crops)
+10.53 tons C/ac

(Before Confidence Interval)
Option: Sampling Alone

Option: Carbon Sensor Scan
Option: Sampling Alone

Option: Carbon Sensor Scan
7.39 tons of C/ac
x $40/ton
= $296/ac
x 100 ac
= $29,600
- $4,000 sampling cost (40 0-36” samples)
= $25,600 net profit

10.13 tons of C/ac
x $40/ton
= $405/ac
x 100 ac
= $40,500
- $3,000 sampling cost ($30/ac, 60 probes@36/insertion)
= $37,500 net profit

2500 acres = $640,000

35.84 tons of C/ac
x $40/ton
= $1432/ac
x 100 ac
= $143,200
- $4,300 sampling cost
= $138,900

2500 acres = $937,500

Year 1
conventional
tillage

Year 10
No-till+

Year 1
conventional
tillage

Year 10
No-till+

Samples only: N=40

Samples and Sensors: N=2160
Measuring vs. Modeling
Per TON vs. Per ACRE
Take-Aways on Soil Carbon:

• Soil can and does add carbon. It requires effort—cover crops, no-till etc.
• Soil carbon (and other soil properties) is highly spatially variable within most fields. Carbon increases are tiny compared to that variability...
• Soil carbon stocks can be measured accurately and affordably—with sensors.
• Ancillary uses of precise soil maps extend beyond soil carbon inventories.
• Unless real SOC validation are advanced, ag will not have the role it could have. Cheap, no validation programs undermine agriculture’s true potential to increase soil carbon.