Natural CLIMATE SOLUTIONS
The Role of Agriculture and Carbon Capture in the Transition
MAY 13th @ 3PM ET
CLIMATE XCHANGE [SCPN]
State Carbon Pricing Network (SCPN)

- Nearly 4,500 advocates, legislators, government officials, business leaders, and academics working to price carbon pollution in their states
- Members across all 50 states
- Learn more at www.climate-xchange.org/network

Noa Dalzell
SCPN Manager
SCPN Services

- Conduct **research studies** on the state-specific impacts of carbon pricing
- Help **draft carbon pricing bills** and provide technical assistance
- Offer opportunities for **cross-state collaboration**, like our monthly national SCPN call and quarterly legislative calls
- Share knowledge and information via our **monthly webinars** and **weekly newsletters**
Today’s Speakers

Max Neumeyer
MAD Agriculture

Jessie Martin
Carbon Washington

Matthew Sheffer
Hudson Carbon
Carbon Farming and Soil Health Policy

Max Neumeyer, Director of Policy
Background
### Strands of regenerative agriculture

<table>
<thead>
<tr>
<th>Rodale Organic</th>
<th>Permaculture/Agroecology</th>
<th>Holistic Management</th>
<th>Soil Profits</th>
<th>&quot;Nature as Measure&quot; Farmsteading</th>
<th>Carbon Farming</th>
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</thead>
<tbody>
<tr>
<td>Created the Regenerative Organic Certification (animal welfare, social fairness, soil health)</td>
<td>Ecological design based on indigenous traditions (eg terra pretta in Amazon)</td>
<td>Known for multipaddock rotational grazing system</td>
<td>Focus on positive economics of conservation practices and reduced input costs</td>
<td>Smaller-scale family farm approach rooted in place</td>
<td>Emphasis on building soil organic carbon, climate and environmental cobenefits</td>
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<tr>
<td>Rodale Institute, Regenerative International</td>
<td>Carol Sanford, ReGen.Network</td>
<td>Savory Institute, Holistic Management International</td>
<td>Gabe Brown, Ray Archuleta, Soil Health Institute, Soil Health Partnership, No-till on the Plains, Noble Research Institute</td>
<td>Wendell Berry, Joel Salatin, Wes Jackson's Land Institute (perennial crops)</td>
<td>Marin Carbon Project, Kiss the Ground, Carbon Cycle Institute, Mad Agriculture</td>
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Soil health principles

Image Credit: General Mills Regenerative Agriculture Self Assessment
Soil health practices

Cover Crops

Compost Application

Planned Grazing

Perennial

Windbreaks

No-Till

Image Credit: Kiss The Ground
Benefits of carbon farming

- Builds soil fertility
- Enhances farmer profitability
- Improves the water cycle
- Carbon sequestration
- Increases biodiversity and resilience
Obstacles to implementation

- Upfront costs, long-term benefits
- Lack of a revenue premium for regenerative goods
- Farmers that rent land don’t benefit from investments in soil
- Increased profits, but reduced yields
- Access to financing, tools and equipment
- Awareness and difficulty of change
The ecosystem of soil health policy

Source: Colorado Watershed Assembly
Federal Soil Health Policy
The Farm Bill is a small part ($489B) of the federal budget.
The share of farm bill spending on conservation has decreased.
CRP, CSP, and EQIP make up the bulk of conservation spending

**Conservation Reserve Program (CRP)**
- Protects soil, water quality, and habitat by removing highly-erodible or environmentally sensitive land from agricultural production through long-term rental agreements.

**Conservation Stewardship Program (CSP)**
- Rewards advanced conservation systems through 5-year renewable payment contracts to farmers and ranchers to actively manage, maintain, and expand conservation practices like rotations, cover cropping, rotational grazing, and IPM on working farms.
- 7.5 million acres. $700 million in 2019 increasing to $1 billion by 2023.

**Environmental Quality Incentives Program (EQIP)**
- Supports working lands conservation through cost-share and technical assistance payments to farmers and ranchers; includes Organic Initiative to support organic practice adoption, High Tunnel Initiative for vegetable production, and multiple regional landscape scale initiatives.
- 13 million acres. $1.75 billion in 2019 increasing to $2.23 billion by 2023.
Other federal conservation programs

**Regional Conservation Partnership Program (RCPP)**
- Enables state and local agencies, non-profit organizations, and other entities to partner regionally with the Natural Resources Conservation Service on special projects to promote farmer adoption of conservation activities to address key natural resource concerns.
- 91 projects funded. $300 million per year.

**Conservation Innovation Grants (CIG)**
- Offers competitive grants to support projects by groups and producers (including on-farm research and demonstrations) to develop and improve access to innovative resource conservation solutions for farmers and ranchers nationwide.
- $37.5 million per year ($25 million for On-farm Conservation Innovation Trials).

**Conservation Loans**
- Offers federal guarantees on private loans to help farmers and ranchers implement qualified conservation practices on their farm, with a priority for beginning farmers.
- $150 million per year.
Priorities for federal soil health policy

- Restore funding to conservation programs
- Invest in soil health RDD&D
- Lay the groundwork for ecosystem services markets
- Turn crop insurance into an incentive for soil health
State-level soil health policy
Soil health policy in the states

March 3, 2020

Soil health policy in the states

- **New Mexico:** [HB 204](https://legiscure.lasrn.org/lb204/2019) and [SB 218](https://legiscure.lasrn.org/sb218/2019) (2019)
  - Defines healthy soils and ID’s soil health principles
  - Includes: soil assessment and education program, healthy soil advisory board, workshops and training
  - Creates “soil health champions”
  - $5.15M for program (FY2020)

  - Creates Healthy Soils Task Force to develop health soils initiative by 2021
  - Provides incentive of $20-45/acre for planting cover crops
  - $250,000 for soil health and climate change research at University of Nebraska

- **California:** [SB859](https://legiscure.lasrn.org/sb859/2016) and [AB1613](https://legiscure.lasrn.org/ab1613/2016) (2016)
  - Creates Healthy Soils Program
  - Defines healthy soils, coordinate agency efforts, R&D, incentives, education
  - [AB2377](https://legiscure.lasrn.org/ab2377/2018) (2018) – 5% of Climate Smart Ag funding for technical assistance (25% of funds for socially-disadvantaged farmers)
  - $7.5M for program and demonstrations

Soil health policy in the states

- **Maryland:** [HB 1063](#) (2017)
  - Defines and supports healthy soils by directing the Agricultural Department to support practices through incentives, R&D, possible funding

- **Oklahoma:** [HB 1192](#) (2001)
  - Creates advisory committee to identify and support practices through R&D, education
  - Funding and opportunities for carbon trading

- **Utah:** [HCR 8](#) (2015)
  - Calls on all agencies “with authority to manage lands to increase soil carbon sequestration”

Possible state-level policy solutions

- Baseline soil health map and data collection
- Soil health champion program and demonstration projects
- Producer-to-producer education programs and technical assistance
- Direct federal funds towards soil health (EQIP / CSP)
- Labelling / market development
- Preferential purchasing through government procurement
Soil health work in Colorado

- **Colorado Collaborative for Healthy Soils**: A bottom-up, big-tent community effort to organize the agricultural community around a soil health program.

  - **Core Principles**: Producer-centered, Science-based, Participatory, Action-oriented, and will only consider policies and programs that are Voluntary / Incentive-based.

  - **Short-term Goals**: (1) Give feedback to CDA as they consider ideas for a Colorado soil health program; (2) Ensure there is adequate funding for soil health activities across the state; (3) be a forum for participants to learn about related initiatives across the state.
Ideas for a soil health program

- **Soil Health Grant Program**: Grants for conservation districts, other organizations and producers for demonstration, education and implementation activities.

- **Bringing Established Programs to Colorado**: Funding to bring the Illinois STAR program, Ecosystem Services Market Consortium and the Soil Health Partnership to Colorado.

- **Soil Health Testing and Research Program**: Free / reduced-cost soil health testing program that provides producers with an onramp to access new revenue streams and samples to CSU researchers to improve soil health testing in Colorado and better understand where we stand as a state.

- **Shared Knowledge and Continued Learning**: Creation of open-source resources and a knowledge-sharing platform focused on helping farmers apply context-specific methods to improve the soil health of their land.
Private-sector initiatives
Corporations are making soil health a priority...

...and many more!
Markets for ecosystem services

Voluntary carbon offset markets:
- American Carbon Registry
- Verified Carbon Standard

Carbon removal markets:
- NORI
- indigo

Ecosystem Services Market Consortium:
- Soil Health Institute
- Noble Research Institute
- Bunge
- Cargill
Big goals for soil health policy

- Order of magnitude increase in conservation spending
- Manhattan project scale investment in soil health RDD&D
- Payments for a range of ecosystem services (e.g., water, biodiversity)
- Price on carbon that pays for carbon sequestration on working lands
- Discounts on crop insurance for conservation practices
- New crop subsidy system that prioritizes soil health
Thank You!

Max Neumeyer   max@madagriculture.org   (917) 828-4887
Sustainable Farms & Fields

Investing in sustainable farms, fields, and supply chains in Washington state
Our vision is for net-zero carbon emissions in Washington state, and a prosperous, healthy future for all.
Effective  Efficient  Equitable
Economic Stimulus + Recovery
Rebuilding for resilience with a price on carbon

Public-Private Partnerships
Investing in sustainable farms, fields, and supply chains

Shared Values, Shared Stories
Defining a just transition for all Washingtonians
Sustainable Farms & Fields

Increased Natural + Economic Resilience

- Increases ecosystem function and environmental health
- Serves farmers’ bottom lines
- Reduces exposure to economic risk
Sustainable Farms & Fields

Robust Metrics + Verification

- Unique “storage equivalency methodology” compares the climate benefits of emissions offsets directly to the sequestration benefits
- Cross-sectoral collaboration on offset verification system
Sustainable Farms & Fields

Farmer-led ideas + innovation

- Cover crops
- Anaerobic digesters
- No till
- Precision ag
- Natural areas
- The next big thing…
"This represents the type of program that gets bipartisan reception. This is an incentive-based program that I think catalyzes innovation - innovation around best practices...and then best practices can be shared."

- Jake Stewart, Sweetwater Farm and Farmer Veteran Coalition
2019 Legislative Session

- Needed more input from key stakeholders
- Funding for agriculture programs already scarce
- Put ag on defense
Getting back to work...together

Stakeholder Engagement + Coalition Building

- Survey to farmers
- Stakeholder meetings
- Gap analysis
- Dedicated staff
2020 Legislative Session

- Language developed by key stakeholders
- Collaborative process
- Farmer support
"That language represents a year-long discussion among a broad stakeholder group that, frankly, those conversations don't happen that often...it's another shining example of what happens when you give reasonable people enough time to have a conversation about important issues."

- Tom Davis, WA State Farm Bureau
What's next?

- Set up program administration
- Establish measurement, accounting, and reporting
- Jumpstart program with private sector investment
Sustainable Farms & Fields

- Reduce atmospheric carbon
- Increase supply chain resilience
- Create economic value and deliver public benefits from private investments
- Foster private sector innovation in the public sector and cross-sectoral knowledge sharing
“Our dairy farmers are being asked by their customers to offer low-carbon milk, and there's some exciting technology to be able to work on that, and this bill holds innovative things like that.”

- Jay Gordon, WA State Dairy Federation
Questions?
jessie@carbonwa.org
www.carbonwa.org

THANK YOU
Agricultural Systems Research

Modeling & Remote Sensing

Carbon Offset Market Infrastructure
REGENERATIVE AGRICULTURAL MANAGEMENT

PRACTICES
- Tillage reduction
- Maximized soil cover to maintain photosynthesis
- Increased biodiversity
- Improved nutrient cycling
- Increase water use efficiency and infiltration
- Animal integration
- Increase terrestrial carbon stocks across the farm (soils, trees, etc.)
COVER CROPPING
COMPOSTING
CROP ROTATION

Crops: Corn, Soybean, Sunflower, Wheat, Barley, Oats, Rye, Buckwheat, Field Peas, CBD Hemp
EXAMPLE ROTATION

CORN

SUNFLOWER

WHEAT

3-4 YEARS PERENNIAL
AGROFORESTRY: TREE PLANTING PLAN FOR STONE HOUSE FARM (our pilot research farm)
Measuring Carbon and Nitrogen Flux in:

- Soil
- Plant Biomass
- Atmosphere
- Water
BIOMASS SAMPLING
ONE-METER SOIL CORE SAMPLING

Core is divided into 5 horizons, at 10cm, 20cm, 30cm, 60cm, & 100cm.
GREENHOUSE GAS FLUX: PORTABLE CHAMBER
EDDY COVARIANCE METHOD

Provides continuous, high-frequency, spatially integrated measurements of GHG's across a large footprint area.
STREAMFLOW MONITORING FOR DRAINAGE SWALES AND STREAMS

Data set:
Flow Volume
Velocity
Quality Parameters:
- Dissolved Oxygen
- Dissolved Organic Matter
- pH/Temperature
- Nitrate
- Ammonium
Large-Scale Monitoring TECHNIQUES

On-The-Go Soil Variability Mapping
Electrical Conductivity Sensor coupled with a Spectrophotometer that measures red and near-infrared reflectance to map soil surface variability.
Large-Scale Monitoring TECHNIQUES

Soil Profile Variability Mapping
The same sensors mounted on a 1-meter account for variability throughout the soil profile.
REMOTE SENSING & MODELING:

Essential Ecosystem Service Market Infrastructure: Hudson Carbon’s On-Going Work

- Offset registries use process-based models to quantify generated offsets using farm management data.
- Currently available models were not designed to quantify offsets in complex, regenerative systems, and therefore significantly under-count the benefits of these systems.
- Using our data, we are currently engaged in calibrating the best existing models, as well as developing a new model that can better quantify offsets in complex systems,
- We are also building a user-friendly (i.e. farmer-friendly) API that also so that farmers will actually use the tool.
- We are also engaged in the development of a remote sensing platform to track field-level management, which will significantly reduce project administration costs.
BIOREGIONAL APPLICABILITY OF MODEL THROUGH CONTINUED GROUND-TRUTHING AND CALIBRATION
Offset Project Registration and Credit Marketing
THE PROBLEM

Farmers should be paid for the carbon sequestration generated through the practice of Regenerative Organic Agriculture.

Existing carbon markets have historically under-counted environmental benefits of Regenerative Organic Agriculture.

These same markets have also failed to differentiate Regenerative Organic Agriculture from other sources of offsets in compelling ways.

THE SOLUTION

An alternative market strategy: A Consumer-funded Carbon Offset Marketplace
OUR MARKETPLACE ENABLES F2C (FARMER TO CONSUMER) CARBON OFFSETS TO INCENTIVIZE REGENERATIVE ORGANIC AGRICULTURAL PRACTICES

REGENERATIVE ORGANIC FARMER
SEQUESTERING CARBON THROUGH FARMING PRACTICES

CARBON CYCLE CLEARINGHOUSE
BUILDING A GLOBAL RESERVE OF NATURALLY SEQUESTERED CARBON

OFFSET GUARANTEE
ENABLING THE VERIFICATION OF QUALITY OFFSETS

MARKETPLACE
CREATING A CUSTOMER-ORIENTED PLATFORM

CARBON BUYER
CONNECTING FARMERS WITH CLIMATE-CONCERNED PEOPLE
WE ARE BUILDING A CARBON OFFSET MARKETPLACE.

WE CONNECT INDIVIDUALS AND BUSINESSES WITH FARMERS TO SELL VERIFIABLE, PLACE-BASED, TANGIBLE, AND TRANSPARENT CARBON OFFSETS.
THE MARKETPLACE

CONNECTS CONSUMERS OF CARBON WITH REGENERATIVE ORGANIC FARMERS THROUGH VIVID FARM IMAGERY TO ILLUSTRATE AND LOCALIZE THEIR IMPACT.
THE MARKETPLACE PROVIDES RELIABLE EXTERNAL VERIFICATION OF SOIL CARBON CREDITS.
THE MARKETPLACE

FOSTERS A CONNECTION TO REAL PEOPLE IN A REAL PLACE DOING THE WORK OF PUTTING CARBON BACK INTO THE SOIL.
AN ACCESSIBLE, EASY TO USE PLATFORM WITH A MOBILE INTERFACE.

Understanding your impact

I am married with no kids
I have 2 bedrooms and 2 cars
My zip code is 11217

Farming Practices
• No till
• Minimal till
• Compost
• Cover crops
• Frost seeding

Notables
This picturesque field is framed by the drum roll of barns and drainage ditches that allow for heavier clay soils to drain. Heavy clay soil holds onto water and needs drainage so tractors don’t get stuck in the wet days. The drains funnel the water away from the fields and connect to a pond at the confluence of two drainage ditches. The pond is also a carbon research site where water enters in this pond and receives water quality including dissolved organic nitrogen and carbon coming off the fields. If you stop and look up, you’ll see blue herons in the adjacent wetlands, chipmunks, red-tailed hawks hunting nearby.

Middle Hill Field

42.07823 N - 73.47891

Middle hill field is named for its gently sloping hill and also because the field is smack dab in the middle of the Mud Creek farm property. To access the field by foot, you walk out the back door of the farm house to the road behind the lab.

Middle Hill Field

77,000 LBS
CARBON OVER THE LAST 5 YEARS

YOUR OFFSET
PARCEL 356 .84 TONS
PARCEL 357 .84 TONS

TOTAL 1.68 TONS
YOUR CARBON IMPACT IS 1.6 TONS
THE MARKETPLACE

OFFSETS WITHIN E-COMMERCE TRANSACTIONS, ACCESSING CUSTOMERS WHERE THEY ARE AND GENERATING HIGHER OFFSET PRICES.
THE MARKETPLACE

PRICING MODEL - Elements of a Functioning Carbon Market

- A carbon market must function to reduce rates of emissions AND increase rates of sequestration through ecosystem restoration. [The biosphere and oceans currently absorb 55% of anthropogenic emissions annually.]
- To do so, it must fully adopt the principles of the carbon cycle, and connect the problem directly to the solution.
- In other words, the value of carbon must be related to its appropriate place, and the price must be high enough to motivate the right kind of behavior.

IDEAL TREND IN EMISSIONS AND SEQUESTRATION RATES (INVERTING THE CURRENT 2:1 RATIO)
THE MARKETPLACE

PRICING MODEL - The Price Point

The current price range of carbon (somewhere between $8 and $20 per ton) DOES NOT MOTIVATE the right kind of behavior modification to alter the relationship between emissions and sequestration.

Farmers will not be motivated to make a whole-system transition for any less than $150-$200 per acre per year. A sequestration rate of 1.5-2 tons/acre/year of carbon is achievable with a whole-system transition to regenerative organic agriculture.

Therefore, a price at which behavior will start to shift on the supply side of the market is of $100 per ton of carbon.

[The demand side is tricky, and will ultimately require better policy levers to motivate behavior.]

MARKETING

Our marketplace model fosters the necessary direct connection between the problem and the solution, between consumers of carbon, and those that manage land to put it back in its proper place.

Our direct-to-consumer marketing approach has the potential to achieve an economy of scale:

- Decrease the unit of sale (fractions of a ton)
- Offering a yearly subscription (offsetting through a payment plan)
- Promote the idea of offsetting through brand partnerships
THANK YOU!
Questions?

Please use the Q&A Box to submit your questions!