FROM PILOTS TO BIG BOLD VISIONS: RAPID SCALING OF CARBON FARMING

August 2017
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FIVE CARBON POOLS

- Atmosphere
- Oceans
- Soil
- Fossil
- Biosphere
- Carbon
Compost increased soil C pools

Soil organic carbon (g m⁻²)

- Control
- Compost


Ryals et al. 2014 Soil Biology & BioChemistry.
Plant production (aka forage) increased every year following a one time compost application.
Rangelands are losing carbon.

The benefits of compost!

increased water-holding capacity
CECSB focuses on regional solutions to climate change

- Produced one of first regional energy blueprints
- Particularly adept at partnerships
Recently completed
SB County Food Action Plan

- Community driven led by NGOs
- Multiple gov agencies involved
- Co-chaired by 2 County Supervisors
- 16 goals, 55 strategies
- “Carbon Farming” emerged as one of top priorities
- Food Action Plans can be an important tool for advocacy
From Pilot To Big Bold Vision

Can we use carbon farming to help meet our County’s Energy and Climate Action Plan

Scientific Proof of Concept
Willing Land Owners
Acreage
Compost
Funding
Regulatory Consistency
Of the total acreage in the County, about 270,000 acres is suitable for compost application

- Slopes less than 25%
- At least 100’ from streams or wetlands
- Most of that is private rangeland
SANTA BARBARA COUNTY – SCALING UP

If we apply compost on 15% (approx. 42,000 acres) we could meet the Big Bold Vision.

➢ One Time Application of ¼” Compost
➢ 35 Cubic Yards Per Acre
➢ 10 Ranches (similar to Chamberlin’s)
SANTA BARBARA COUNTY – SCALING UP

We will need a lot of this:
Or actually more like this:
Food waste management:

**Opportunity:** Turning 20m tons/year of food waste in Calif into useful end product

**Barrier:** Currently enough processing facilities in the state to handle half of that
Small-scale compost projects:

**Opportunity:** increase small-scale composting operations (<12,500 cubic yards)

**Barrier:** education/training; marketplace gray area – most operations running under the radar
Meet County climate action plan goals:

**Opportunity:** Offset ag sector emissions with voluntary measures

**Barrier:** Lack of education in P&D -- ie compost vs ground cover, current research on carbon farming
Co-benefits for landowners:

**Opportunity:** Increase resilience of ag lands to drought

**Opportunity:** Increase forage production

**Opportunity:** With some audiences don’t need to refer to climate benefits
Regulatory landscape:

**Barrier:** local and regional permitting (ie zoning permits; Environmental Health Dept; Regional Water Quality Board regs)

**Opportunity:** Statewide policy (AB 1826 ban on organic material; Healthy Soils Initiative)
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August 2017
TED CHAMBERLIN RANCH
Los Olivos, Santa Barbara County California
GRAZING GOALS

GOAL: MAXIMIZE FORAGE PRODUCTION, INCREASE SOIL CARBON AND SOIL WATER HOLDING CAPACITY, PROTECT WATER QUALITY, IMPROVE PASTURE NUTRITIONAL PROFILE AND INCREASE LENGTH OF GRAZING SEASON.
R2R TRIAL SITE

2014
CONTINUOUS GRAZING
7.42” RAINFALL

2015
PLANNED GRAZING
7.72” RAINFALL
PERENNIAL PLANTS

NEW “COAST LIVE OAK” TREES 2017

PERENNIAL GRASS
AUGUST 2017
SITE #1 – NRCS TEST SITE WITH JEFF BOREM, (SHOWN HERE) WE ARE 1 OF 17 SITES IN CA.
SITE #2 WITH Dr. JOSH SCHIMEL FROM UCSB AND Dr. WHENDEE SILVER FROM UC BERKELEY
COMPOST APPLICATION – NOV 2017

¼” COMPOST APPLICATION
COMPOST RESULTS – FEB 2017

COMPOSTED AREA
16% INCREASE IN FORAGE

NO COMPOST

Photo © Andrew Hill
<table>
<thead>
<tr>
<th>PRACTICE</th>
<th>AVERAGE ANNUAL CO2e SEQUESTRATION</th>
<th>20 YEAR CO2e SEQUESTRATION</th>
<th>CO2e SEQUESTRATION AT MATURITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rangeland Compost</td>
<td>638 Mg</td>
<td>98,847 Mg</td>
<td>162,619 Mg (30 years)</td>
</tr>
<tr>
<td>Cropland Compost (590)</td>
<td>2,060 Mg</td>
<td>23,200 Mg</td>
<td>43,374 Mg at 5% SOM</td>
</tr>
<tr>
<td>Shelterbelts (380)</td>
<td>98 Mg</td>
<td>1,960 Mg</td>
<td>7,840-19,260 Mg at 80 years</td>
</tr>
<tr>
<td>Hedgerows (422)</td>
<td>6 Mg</td>
<td>120 Mg</td>
<td>120 Mg</td>
</tr>
<tr>
<td>Prescribed Grazing (528)</td>
<td>1,460 Mg</td>
<td>29,200</td>
<td>29,200</td>
</tr>
<tr>
<td>Riparian Restoration</td>
<td>410 to 1,725 Mg</td>
<td>6,144 - 25,867 Mg at 15 years</td>
<td>18,431 - 77,613 Mg at 45 years</td>
</tr>
<tr>
<td>No Till (329)</td>
<td>39 Mg</td>
<td>780 Mg</td>
<td>780 Mg</td>
</tr>
<tr>
<td>Minimum-Tillage (345)</td>
<td>100 Mg</td>
<td>2,000 Mg</td>
<td>2,000 Mg</td>
</tr>
<tr>
<td>Silvopasture (281)</td>
<td>660 Mg</td>
<td>13,200 Mg</td>
<td>214,000 Mg</td>
</tr>
<tr>
<td>Nutrient Management (590)</td>
<td>610 Mg</td>
<td>12,200 Mg</td>
<td>48,800</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>6,081 - 7,396 Mg</strong></td>
<td><strong>187,651 - 207,374 Mg</strong></td>
<td><strong>527,164 - 597,766 Mg</strong></td>
</tr>
<tr>
<td>PRACTICE</td>
<td>DESCRIPTION</td>
<td>20 YEAR SOM INCREASE (Mg)</td>
<td>ANNUAL MHC INCREASE BY YEAR 20 (AF)</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Compost application on Rangeland (NRCS practice standard in development)</td>
<td>Application of 1/4&quot; of compost to 4300 acres of permanent pasture.</td>
<td>53867 Mg</td>
<td>493.78</td>
</tr>
<tr>
<td>Compost application on Cropland (590)</td>
<td>Application of 1&quot; of compost to 617 acres of cropland.</td>
<td>23637.05 Mg</td>
<td>216.67</td>
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<tr>
<td>Shelterbelt (380)</td>
<td>13.6 miles (90 acres) of 50' wide shelterbelts</td>
<td>1068.12 Mg</td>
<td>9.79</td>
</tr>
<tr>
<td>Prescribed Grazing (528)</td>
<td>Grazing management to favor perennials and improve production on 7300 acres.</td>
<td>15912.80 Mg</td>
<td>145.86</td>
</tr>
<tr>
<td>Riparian Restoration</td>
<td>Restoration of 94 acres of riparian system along 7.75 miles of stream corridor Planting of native trees and shrubs.</td>
<td>3043.23 Mg (derived from Lewis et al 2015)</td>
<td>27.89</td>
</tr>
<tr>
<td>No-till system - Tillage Management (512)</td>
<td>Convert tilled forage fields to permanent pasture; minimize tillage on croplands</td>
<td>425.06 Mg</td>
<td>3.89</td>
</tr>
<tr>
<td>Minimum-Tillage (345)</td>
<td>Conversion of tilled crop fields to minimum tillage on</td>
<td>1089.91 Mg</td>
<td>9.99</td>
</tr>
<tr>
<td>Silvopasture (381)</td>
<td>Establish trees on approximately 1000 acres of treeless pasture.</td>
<td>4027.24 Mg (derived from Gaman 2008)</td>
<td>36.91</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>917.52</td>
<td></td>
</tr>
</tbody>
</table>
MONITORING FOR

CARBON
SOIL BIOLOGY
% ORGANIC MATER
WATER INFILTRATION RATE
AND MUCH MORE

WATER CYCLE
MINERAL CYCLE
ENERGY FLOW
COMMUNITY DYNAMICS
SANTA BARBARA PARTNERS

- Ted Chamberlin Ranch
- Cachuma Resource Conservation District
- Community Environmental Council
- CalPoly University
- Carbon Cycle Institute
- LegacyWorks
- Santa Barbara County Air Pollution Control District
- Santa Barbara Foundation
- UC Berkeley
- UC Davis
- UC Santa Barbara
- UC Cooperative Extension
- USDA Natural Resources Conservation Service
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August 2017

Anna Olsen
Executive Director
Cachuma Resource Conservation District

Emily Miller
Food & Climate Program Associate
Community Environmental Council

Russell Chamberlin
Rancher
Ted Chamberlin Ranch
Santa Barbara County

Sharyn Main
Senior Director of Community Investments
Santa Barbara Foundation

Aeron Arlin Genet
Air Pollution Control Officer
Santa Barbara County
Air Pollution Control District
Mission:
To facilitate the building of philanthropy, strengthen the nonprofit sector, and identify and strategically address important community opportunities and needs.

Founded: 1928
Total Assets: $360 Million
Grants: $18M in SB County (over $300,000,000 since inception)
LEAF INITIATIVE

Connecting people, ideas & resources to advance regional strategies and community-driven solutions.

• Land Conservation
• Ecosystem Health
• Agriculture Viability
• Food System Improvements
LEAF STRATEGY

- Supporting Community Change
  - Transforming the Local Food System

- Developing Tools & Resources
  - Science-based Tools and Shared Resources

- Building Capacity
  - Grants, Donors & Impact Investing

- Supporting Innovation
  - Cross-sector Collaborations & New Approaches to Solving Community Problems
PLANNING & RESOURCE TOOLS

Food Action Plan & Conservation Blueprint
Bringing Rancher To Rancher to Santa Barbara County
SUPPORTING INNOVATION

Seeding & Scaling Carbon Farming in Santa Barbara County

$5K 2013

$15K 2014

$20K 2016

$26K 2016/17
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STATE & COUNTY POLICY
How governments and agencies can support
KEY POLICY DRIVERS

- California’s Global Warming Solutions Act (AB 32)
  - ARB’s Scoping Plan – includes Working / Natural Lands & Ag
- Governor’s Climate Change Pillars — 2030 GHG Reduction Goals
- New GHG emission limits of 40% below 1990 levels by 2030 (SB 32)
- Banning organic waste from landfills (AB 1826 & SB 1383)
  - Creating new market for compost
- 50% diversion of organic materials by 2020 / 75% by 2025
- Mitigation for local land use projects (SB 97) & Climate Action Plans
- Desire for local mitigation versus purchasing credits from out of state, etc.
- CEQA thresholds used by lead agencies
CALIFORNIA CLIMATE STRATEGY

An Integrated Plan for Addressing Climate Change

VISION

Reducing Greenhouse Gas Emissions to 40% Below 1990 Levels by 2030

GOALS

- 50% reduction in petroleum use in vehicles
- 50% renewable electricity
- Double energy efficiency savings at existing buildings
- Carbon sequestration in the land base
- Reduce short-lived climate pollutants
- Safeguard California
STATE’S EFFORTS IN LAND SECTOR

- Forest Carbon Plan
- Healthy Soils
  - Cover crops
  - Crop rotation
  - Increase water holding capacity
  - Permit new compost and anaerobic digestion facilities by 2020
- Bioenergy Action Plan
- Urban and Community Forestry Program
- Wetlands Restoration
LOCAL AIR DISTRICT’S ROLE

- Provide assistance to local governments on the implementation of state law
  - Climate Action Plan development and implementation
  - Thresholds of Significance for GHG emissions
- Local mitigation programs to reduce GHG emissions
  - Work with lead agencies, project proponents to identify mitigation options
- CAPCOA GHG Rx
CAPCOA’S GHG Rx

- Statewide exchange
- Voluntary reduction projects in California
- Air districts validate credits
- Application to projects statewide, as well as Santa Barbara County
- Methodology for Compost Additions to Grazed Grasslands

http://ghgrx.org/
GHG RX PROTOCOL

- Document baseline management
- Sample and analyze soil
- Collect compost data
- Apply compost
- Track emissions from application
- Sample and analyze soil
- Track new management practices
- Validate model
- Ongoing tracking
- Calculate reductions using model
- Every ten years, re-verify
NEED FOR LOCAL MITIGATION

- Santa Barbara County’s significance threshold for industrial sources
  - 1,000 MTCO2e/yr
  - Mitigate Cap-and-Trade “gap”
- 3 major projects in the pipeline
  - Over 700 well
  - Up to 8 million MTCO2e (lifetime of projects)
- Implementation of local Climate Action Plan Goals
IMPORTANCE OF COLLABORATION

- Central Coast Climate Collaborative
  - Collaborating to achieve a resilient, low-carbon Central Coast

- US Department of Ag / Natural Resources Conservation Service
  - Key policy & funding foundation for healthy soils work

- Cap-and-trade funding allocations (AB 1613)
  - Allocates $903 million in cap-and-trade funding
    - $65 million to the Department of Food and Agriculture
    - $7.5 million for the Healthy Soils Program

- Strategic Growth Council
  - Ag focused program administered by Dept of Conservation

- CEQA mitigation
  - Demonstrate effectiveness of health soils projects
THANK YOU!