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

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

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FIVE CARBON POOLS

志



CARBON FARMING



MARIN CARBON PROJECT FINDINGS

Compost increased soil C pools



Ryals et al. 2014 Soil Biology & BioChemistry.

MARIN CARBON PROJECT FINDINGS

Plant production (aka forage) increased every year following a one time compost application



MARIN CARBON PROJECT FINDINGS



COMMUNITY ENVIRONMENTAL COUNCIL



Community Environmental Council

SANTA BARBARA COUNTY

- CECSB focuses on regional solutions to climate change
 - Produced one of first regional energy blueprints
 - Particularly adept at partnerships



SANTA BARBARA COUNTY

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

SANTA BARBARA COUNTY – SCALING UP

- 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

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:

SANTA BARBARA COUNTY – SCALING UP

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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TED CHAMBERLIN RANCH Los Olivos, Santa Barbara County California



3 GENERATIONS



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.

RANCHER TO RANCHER (R2R)

R2R TRIAL SITE

2014

CONTINIOUS GRAZING 7.42" RAINFALL

2015

PLANNED GRAZING 7.72" RAINFALL

R2R TRIAL SITE



11.38" RAINFALL



25.6" RAINFALL

GRAZING THE R2R TRIAL SITE - 2016

2-14

PERENNIAL PLANTS

NEW "COAST LIVE OAK" TREES 2017

PERENNIAL GRASS AUGUST 2017

12 24 17 24

NON GRAZED VS PLANNED GRAZING

NON GRAZED 15 PLUS YEARS

PLANNED GRAZING

SUMMER 2017

COMPOST TEST SITES - 2016

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 BERKLEY

COMPOST APPLICATION – NOV 2017

1/4" COMPOST APPLICATION

COMPOST RESULTS – FEB 2017

COMPOSTED AREA 16% INCREASE IN FORAGE

NO COMPOST

Andrew-Hill

Photo © Andrew Hill

CO2E SEQUESTRATION POTENTIAL, COMET PLANNER

1Mg = 1 Metric Ton

PRACTICE	AVERAGE ANNUAL CO2e SEQUESTRATION	20 YEAR CO2e SEQUESTRATION	CO2e SEQUESTRATION AT MATURITY
Rangeland Compost	638 Mg	98,847 Mg	162,619 Mg (30 years)
Cropland Compst (590)	2,060 Mg	23,200 Mg	43,374 Mg at 5% SOM
Shelterbelts (380)	98 Mg	1,960 Mg	7,840-19,260 Mg at 80 years
Hedgerows (422)	6 Mg	120 Mg	120 Mg
Prescribed Grazing (528)	1,460 Mg	29,200	29,200
Riparian Restoration	410 to 1,725 Mg	6,144 - 25,867 Mg at 15 years	18,431 - 77,613 Mg at 45 years
No Till (329)	39 Mg	780 Mg	780 Mg
Minimum-Tillage (345)	100 Mg	2,000 Mg	2,000 Mg
Silvopasture (281)	660 Mg	13,200 Mg	214,000 Mg
Nutrient Management (590)	610 Mg	12,200 Mg	48,800
Totals	6,081 - 7,396 Mg	187,651 - 207,374 Mg	527,164 - 597,766 Mg

ESTIMATED ADDITIONAL SOIL WATER HOLDING CAPACITY

PRACTICE	DESCRIPTION	20 YEAR SOM INCREASE (Mg)	ANNUAL MHC INCREASE BY YEAR 20 (AF)
Compost application on Rangeland (NRCS practice standard in development)	Application of 1/4" of compost to 4300 acres of permanent pasture.	53867 Mg	493.78
Compost application on Cropland (590)	Application of 1" of compost to 617 acres of cropland.	23637.05 Mg	216.67
Shelterbelt (380)	13.6 miles (90 acres) of 50' wide shelterbelts	1068.12 Mg	9.79
Prescribed Grazing (528)	Grazing management to favor perennials and improve production on 7300 acres.	15912.80 Mg	145.86
Riparian Restoration	Restoration of 94 acres of riparian system along 7.75 miles of stream corridor Planting of native trees and shrubs.	3043.23 Mg (derived from Lewis et al 2015)	27.89
No-till system - Tillage Management (512)	Convert tilled forage fields to permanent pasture; minimize tillage on croplands	425.06 Mg	3.89
Minimum-Tillage (345)	Conversion of tilled crop fields to minimum tillage on	1089.91 Mg	9.99
Silvopasture (381)	Establish trees on approximately 1000 acres of treeless pasture.	4027.24 Mg (derived from Gaman 2008)	36.91
TOTAL			917.52

MONITORING FOR

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

> WATER CYCLE MINERAL CYCLE ENERGY FLOW COMMUNITY DYNAMICS

MANAGEMENT

in the

COLLABORATION - 2016

- Martine The

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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SANTA BARBARA FOUNDATION

Mission:

To facilitate the building of philanthropy, strengthen the nonprofit sector, and identify and strategically address important community opportunities and needs.



SANTA BARBARA FOUNDATION

Founded: 1928

Total Assets: \$360 Million

Grants: \$18M in SB County (over \$300,000,000 since inception) 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



CREATING A LANDSCAPE OF OPPORTUNITY SANTA BARBARA COUNTY **CONSERVATION BLUEPRINT** COMMUNITY AND THE LAND WATER RESOURCES FLORA AND FAUNA AG AND RANCHLANDS

CAPACITY BUILDING

Bringing Rancher To Rancher to Santa Barbara County



Seeding & Scaling Carbon Farming in Santa Barbara County



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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



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

GOALS

50% reduction in petroleum use in vehicles



50% renewable electricity

Carbon sequestration in the land base



Double energy efficiency savings at existing buildings



Safeguard California



Reduce short-lived climate pollutants

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
 California Air Districts
 - 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!