EPA has a new version of WARM

- And a new report on landfill methane emissions
- The new report puts together the pieces from old data
- It is terrific to see the agency put 2+2 together

JANUARY 16, 2024 | CLIMATE, COMPOSTING, CONNECTIONS, FOOD WASTE, POLICIES + REGULATIONS

Connections: Food Waste And Landfill Methane Report — A Giant Step On A Long Road

RELATED POSTS

Connections: Careful How You Calculate Urban Agriculture's Carbon Intensity

https://www.biocycle.net/connections-food-waste-and-landfill-methane-report-a-giant-step-on-a-long-road/

Giant step

https://www.biocycle.net/connections-food-waste-and-landfill-methane-report-a-giant-step-on-a-long-road/

Food scraps are your ideal feedstocks for making methane

- Food scraps contain the perfect blend of moisture and nutrients
- They decompose readily
  - Just look in the back section of your refrigerator
- Because they are so wet (75% water) this decomposition gets smelly fast
- Odor indicates anaerobic conditions

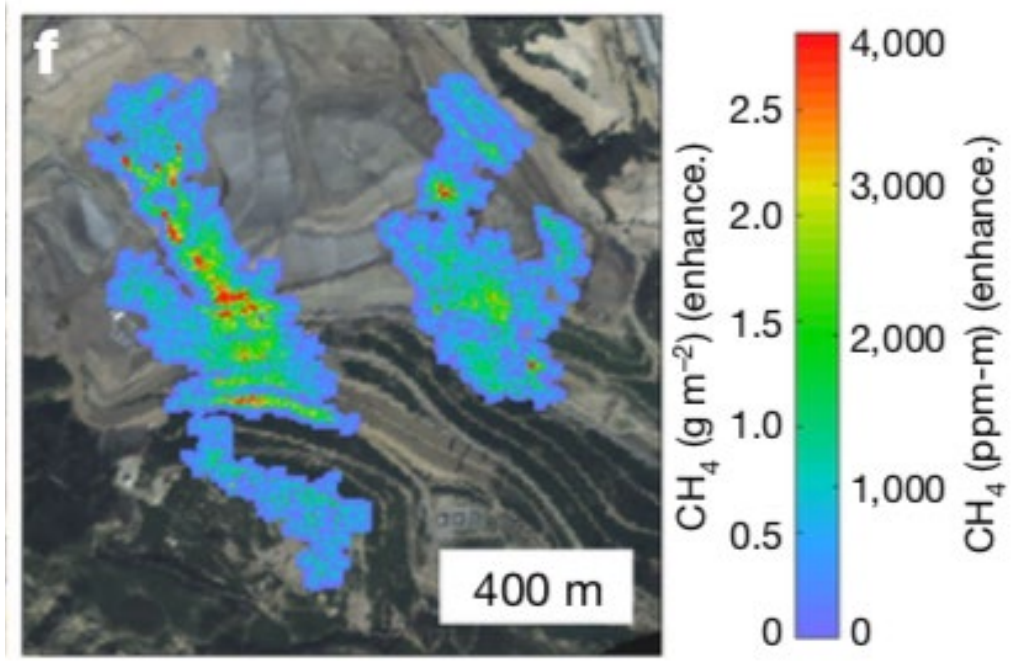
US EPA WAste Reduction Model

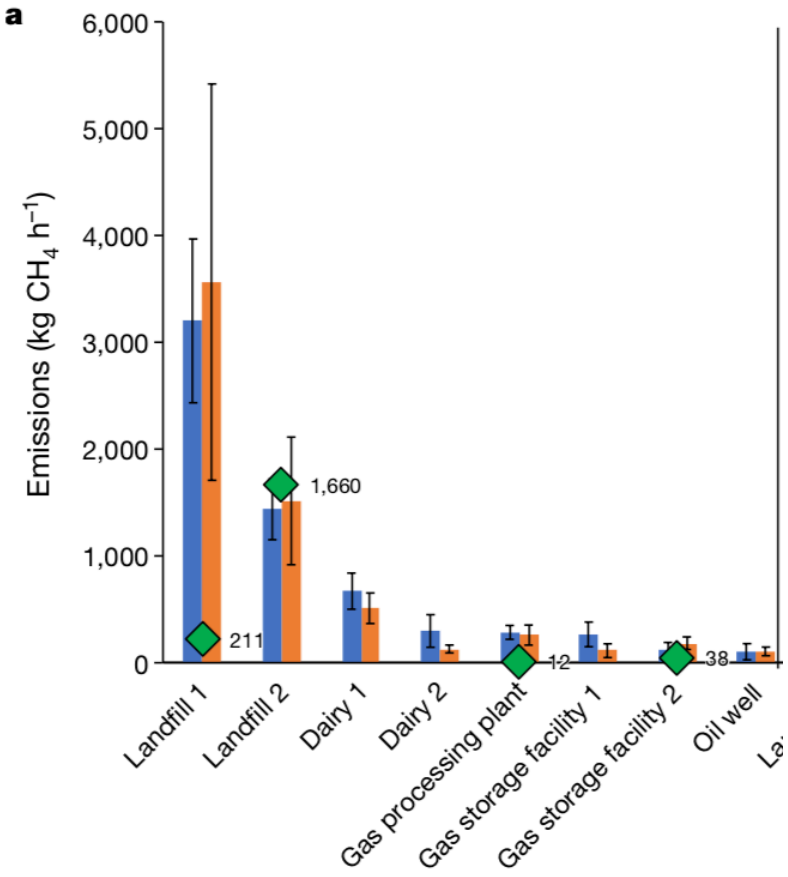
About a 1:1 balance between food scraps in and CO_2e out (as CH_4)
And that estimate is based on old, very conservative data

Their landfill emissions were also based on estimates

Recent studies have actually found the gas

California's methane super-emitters



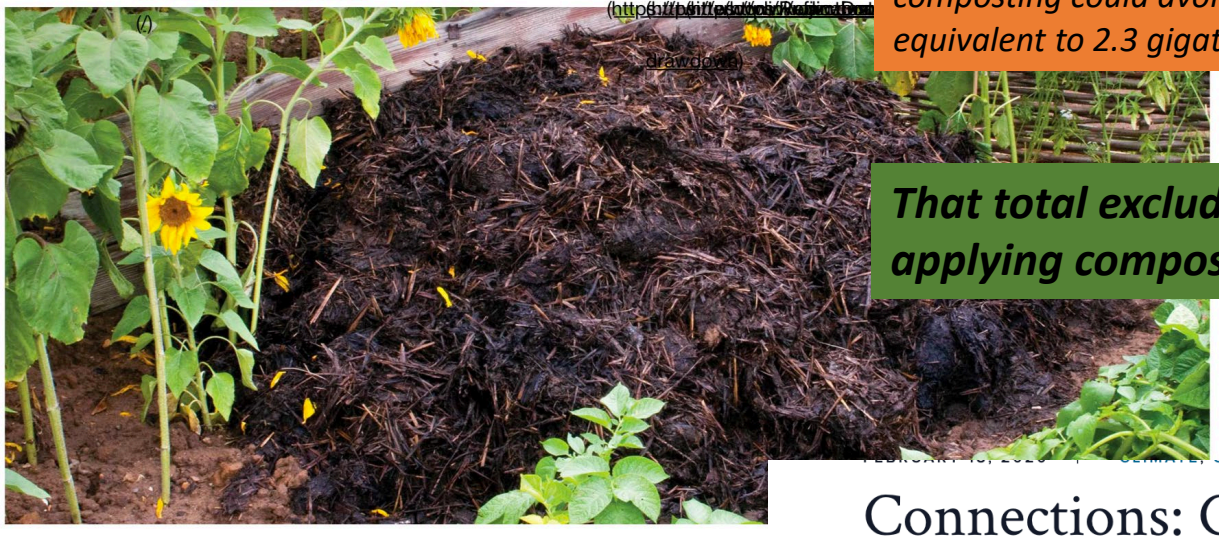


So I applaud your entry into what I'd call it an 'elite' group

And remind you where you can read all about benefits associated with your elite membership

PROJECT DRAWDOWN

email sign up donate (/donate)



composting could avoid methane emissions from landfills equivalent to 2.3 gigatons of carbon dioxide by 2050.

That total excludes additional gains from applying compost to soil.

FOOD
COMPOSTING

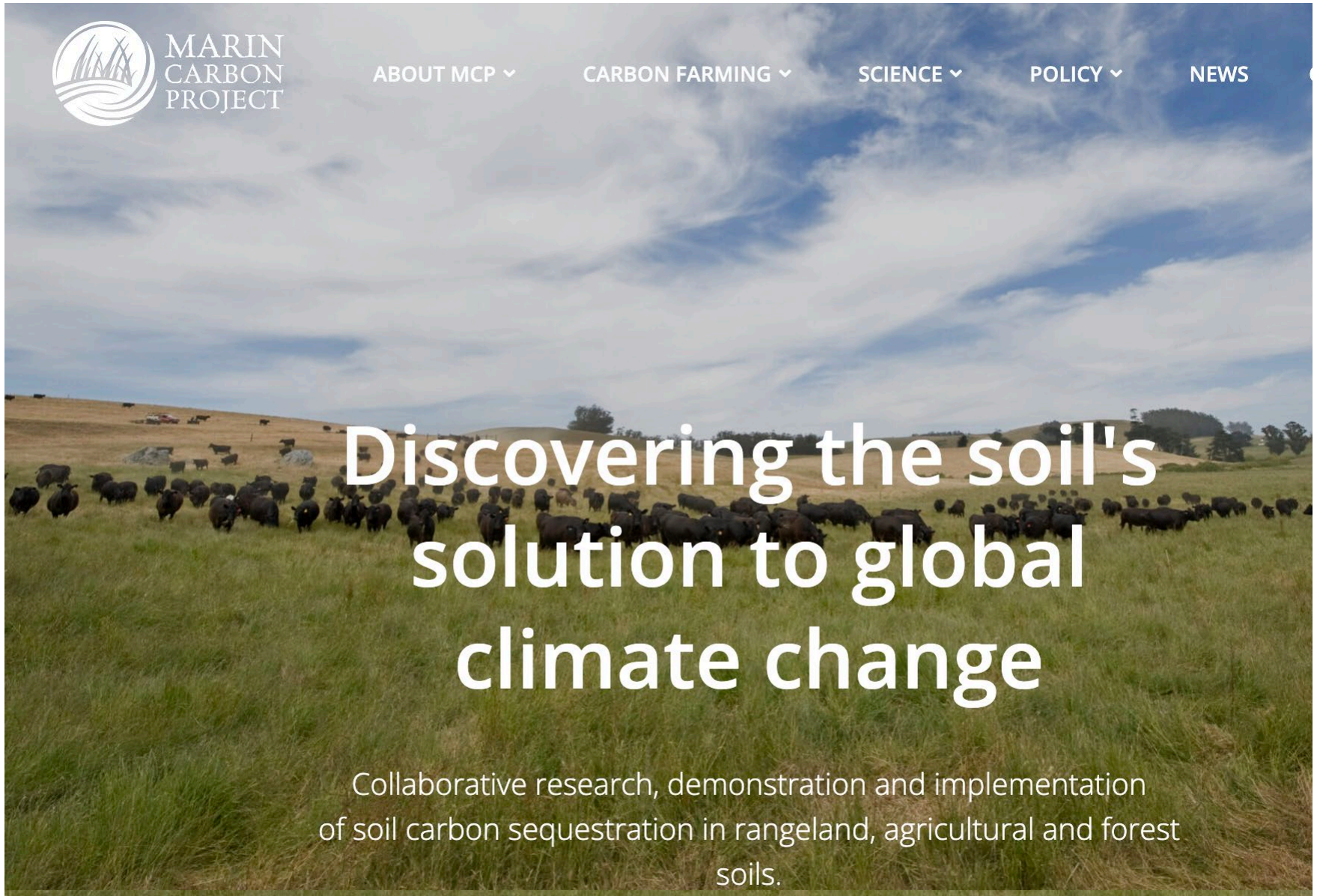
Connections: Can Compost Draw Down Carbon?

Series examines all the ways compost reduces CO_2 in the atmosphere. Part I

Sally Brown

https://www.biocycle.net/connections-can-compost-draw-carbon/

But your coolness only starts with CH_4 avoidance



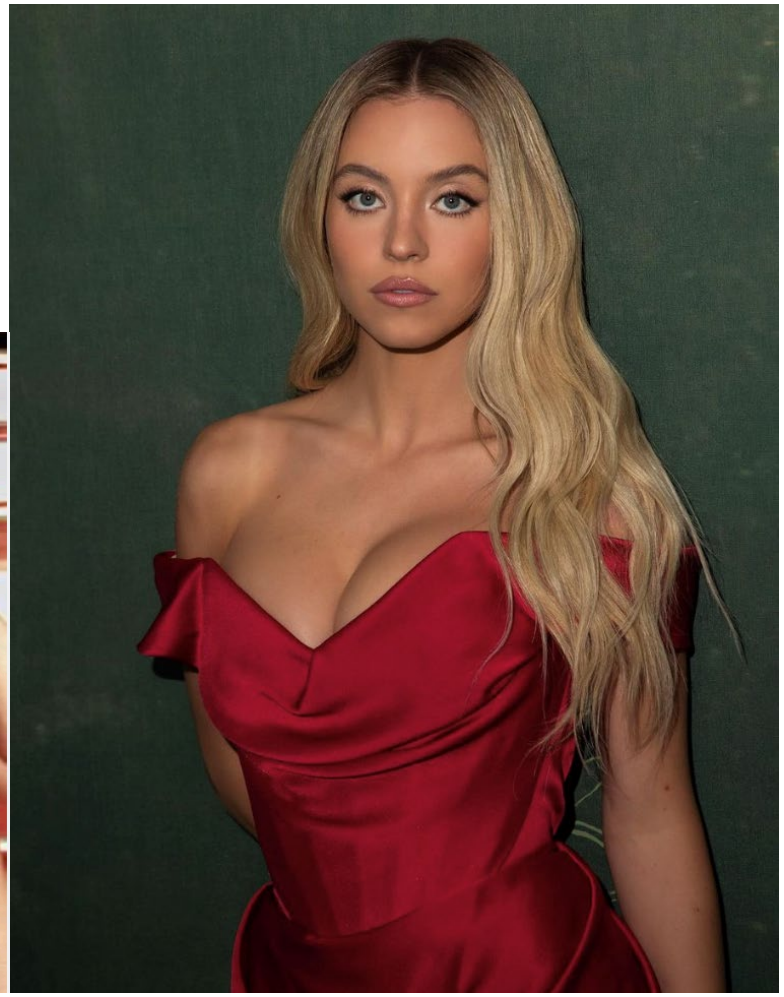
Soil carbon sequestration has been seen as a critical tool for both climate change and soil health

Regenerative agriculture requires healthy soil
Soil health = increased soil carbon

https://soilhealthinstitute.org/

Soil is now sexy

- Maybe not exactly in a Sydney Sweeny kind of way
- More of a save the planet and continue to eat kind of way



And just to let you know that I've been around for awhile

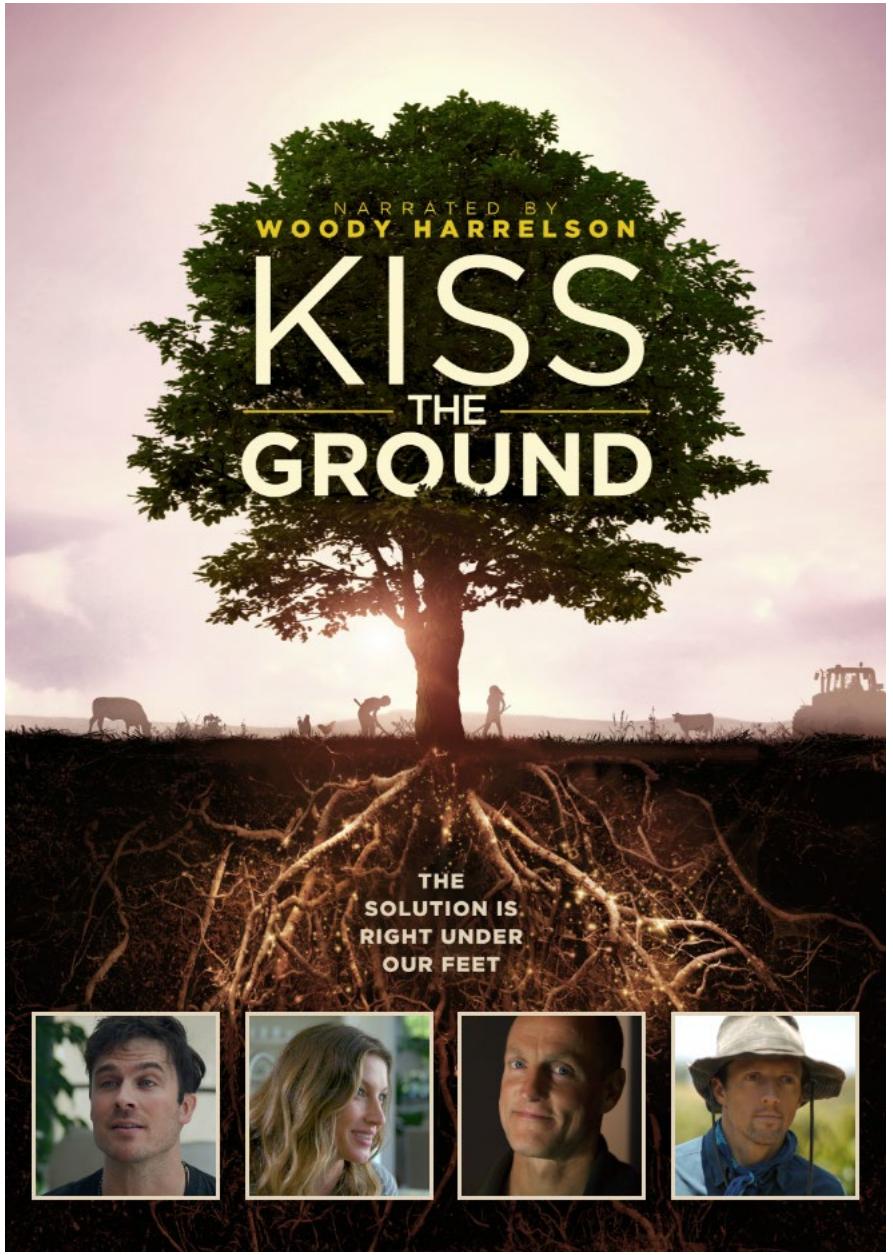
You have start ups focused on soil

Stanford junior wins 2021 Congressional Medal of Honor Society Service Award - Stanford Today

stanford.io

And now there are movies

- **From Josh Tickell, one of America's most celebrated documentary filmmakers, comes a "fascinating, easy-to-follow blueprint for how eating in ways that nourish and regenerate the soil can not only help reverse global warming, but also bring greater vitality to our lives" (Wolfgang Puck).**



COMMON GROUND

TICKETS JOIN ABOUT FOR SCHOOLS PRESS PARTNERS
RESOURCES SHARE MERCH

IN SELECT THEATERS NOW

REQUEST A SCREENING

SHARE THE TRAILER

States (CA and WA) now have or are developing soil health initiatives
And compost is an integral part of these

- Yorgey et al. (2017) identified the following as a priority for cropland agriculture in the PNW: Develop technical or other approaches to overcome existing barriers to increasing organic inputs (e.g., compost, manure, biosolids, biochar) in cropping systems, to support adoption of practices with substantial potential to increase carbon sequestration across the region.

WASHINGTON SOIL HEALTH INITIATIVE ROADMAP 2021

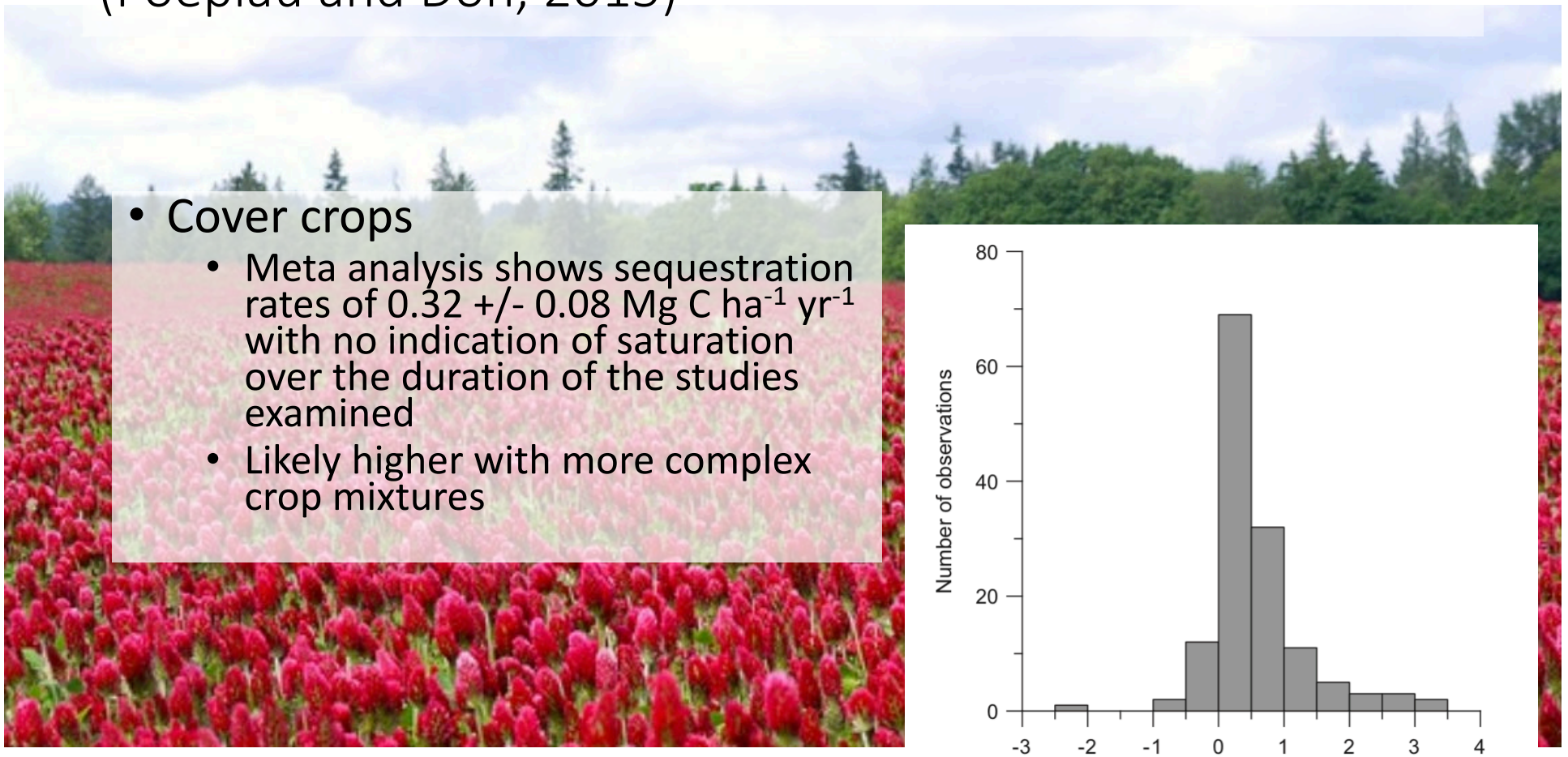
Why Compost?

No- till agriculture

- Had been the big answer
- Meta studies (compilation of all studies) show benefits limited to surface
- Most cases you borrow from the bottom

Cover Crops

(Poeplau and Don, 2015)



- Cover crops
  - Meta analysis shows sequestration rates of 0.32 +/- 0.08 Mg C ha^{-1} yr^{-1} with no indication of saturation over the duration of the studies examined
  - Likely higher with more complex crop mixtures

Except a recent study suggests that it too may steal from the bottom

Tautges et al., 2019

- Corn tomato rotation
  - Cover crop +/- poultry manure compost
  - Deep soil sampling
- Cover crop
  - + 1.44 Mg C ha in 0-30 cm
  - - 14.9 Mg C ha in 30-200
- Cover crop + poultry manure compost
  - + 21.8 Mg C ha 0-200 cm

EOM- exogenous organic matter
The proven alternative for soil carbon and soil health

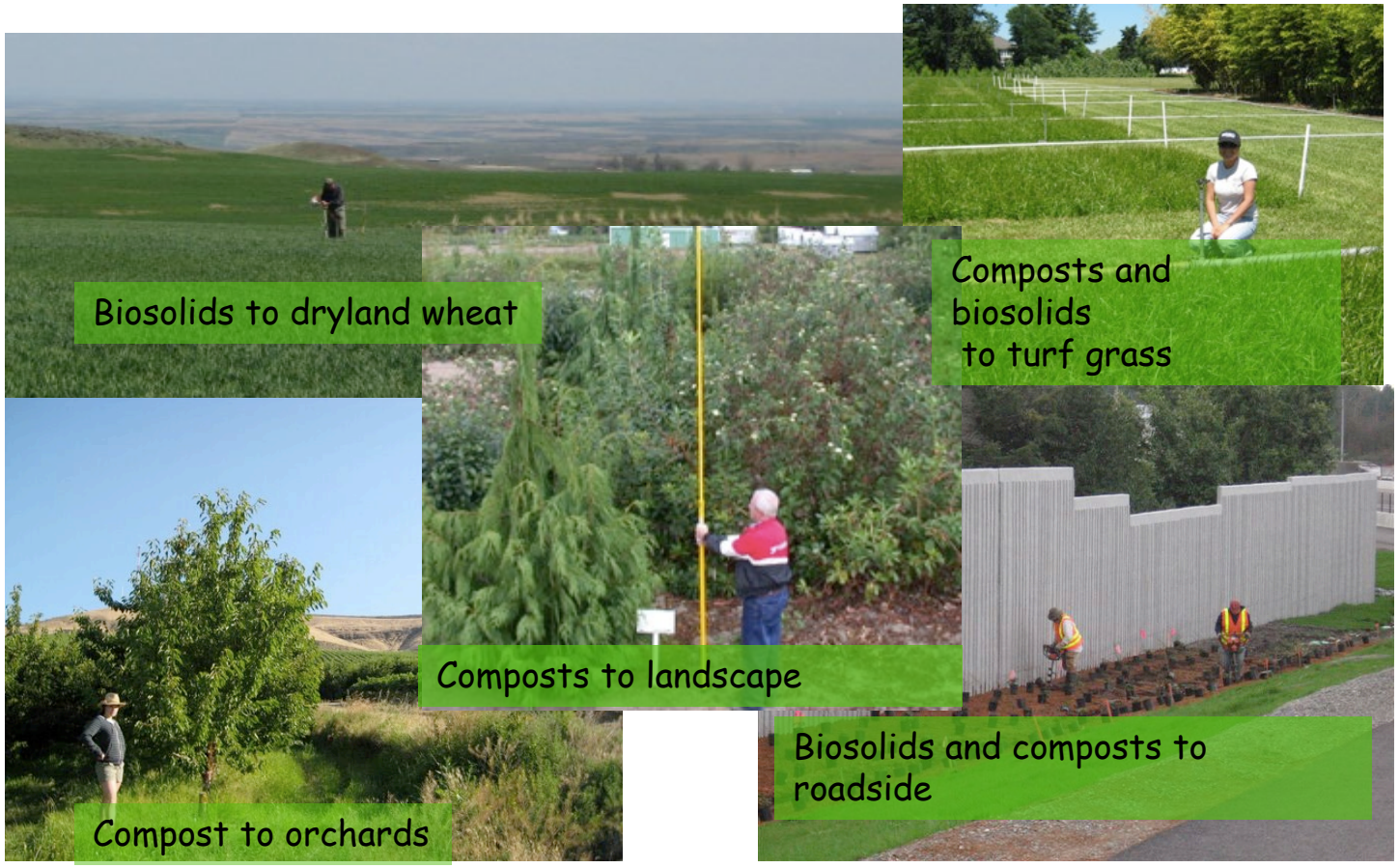
Levavasseur et al., 2020

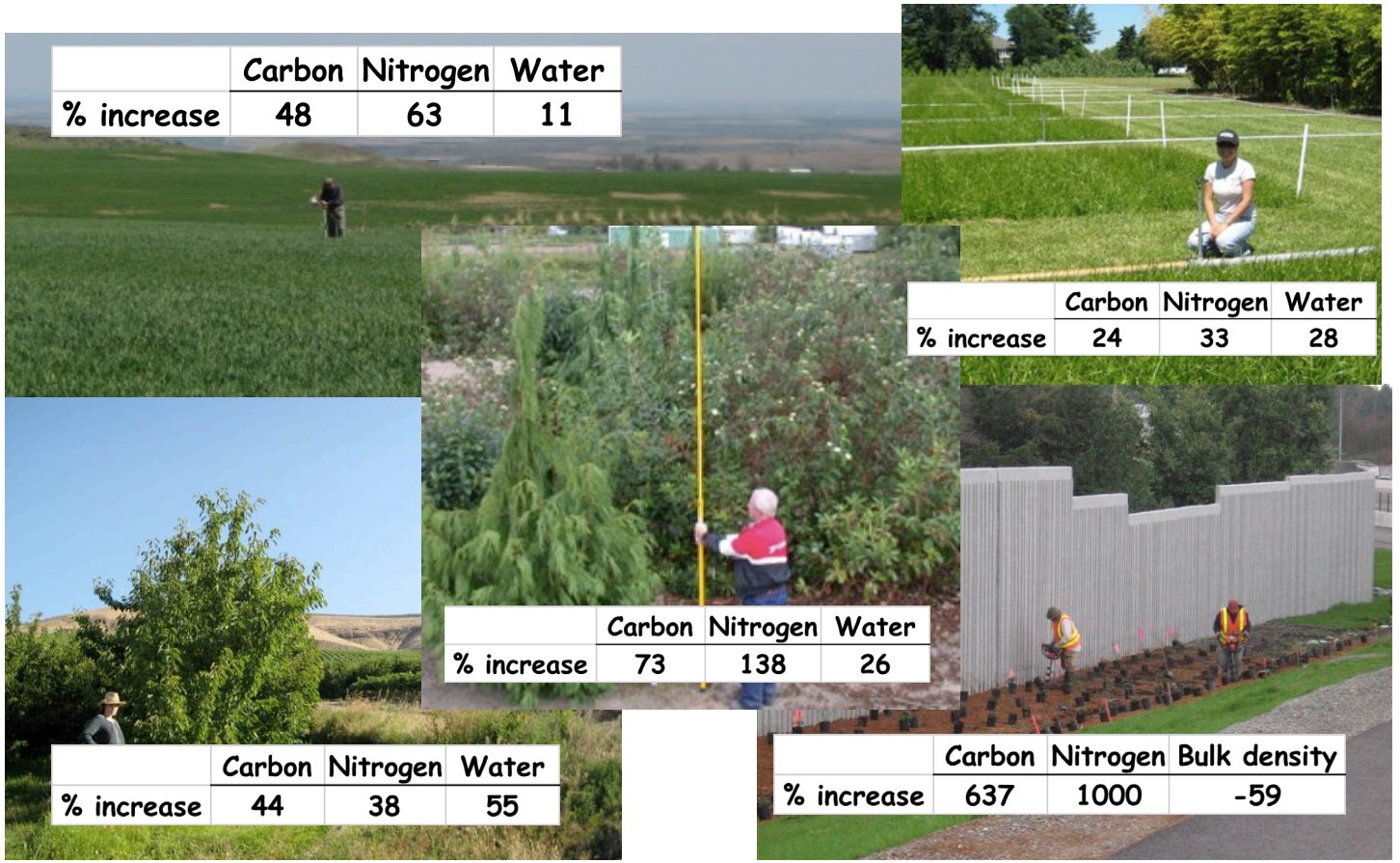
- AMG model- range of European field trials
  - Report ‘h’ or fraction of added C that stays put
    - Biosolids 66%
    - Green waste compost 100%
    - MSW Compost 82%

Aerial photo of long-term research plots that receive King County (WA) biosolids to grow dryland wheat. Photo courtesy of King County

My (Kate Kurtz) own work

Brown et al., 2011





	Carbon	Nitrogen	Water
% increase	48	63	11

	Carbon	Nitrogen	Water
% increase	24	33	28

	Carbon	Nitrogen	Water
% increase	73	138	26

	Carbon	Nitrogen	Water
% increase	44	38	55

	Carbon	Nitrogen	Bulk density
% increase	637	1000	-59

Recycled organics: The best tool we have

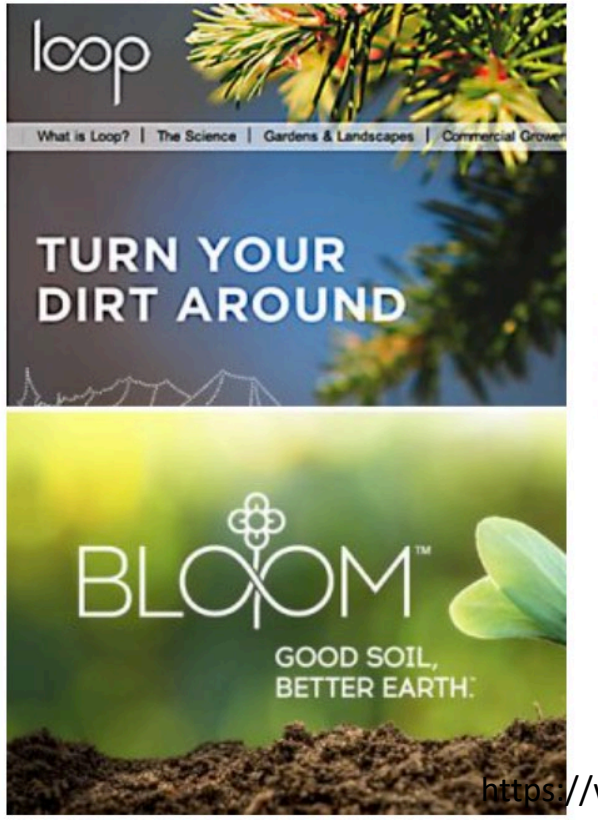


Table 1. Recycled organics vs. cover crops — increases in soil carbon

	Soil carbon increase		How many times more effective than cover crops
	As CO_2e	As Carbon	
Farmyard manure	2.3	0.71	2.4
Dairy slurry	1.1	0.30	1.0
Digested biosolids	5.5	1.50	5.0
Green compost	5.13	1.39	4.6

https://www.biocycle.net/connections-regenerative-agriculture-needs-recycled-organics/

USDA- NRCS

United States Department of Agriculture

336-CPS-1

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

SOIL CARBON AMENDMENT

CODE 336

(ac)

DEFINITION

Application of carbon-based amendments derived from plant materials or treated animal byproducts.

PURPOSE

Use this practice to accomplish one or more of the following purposes:

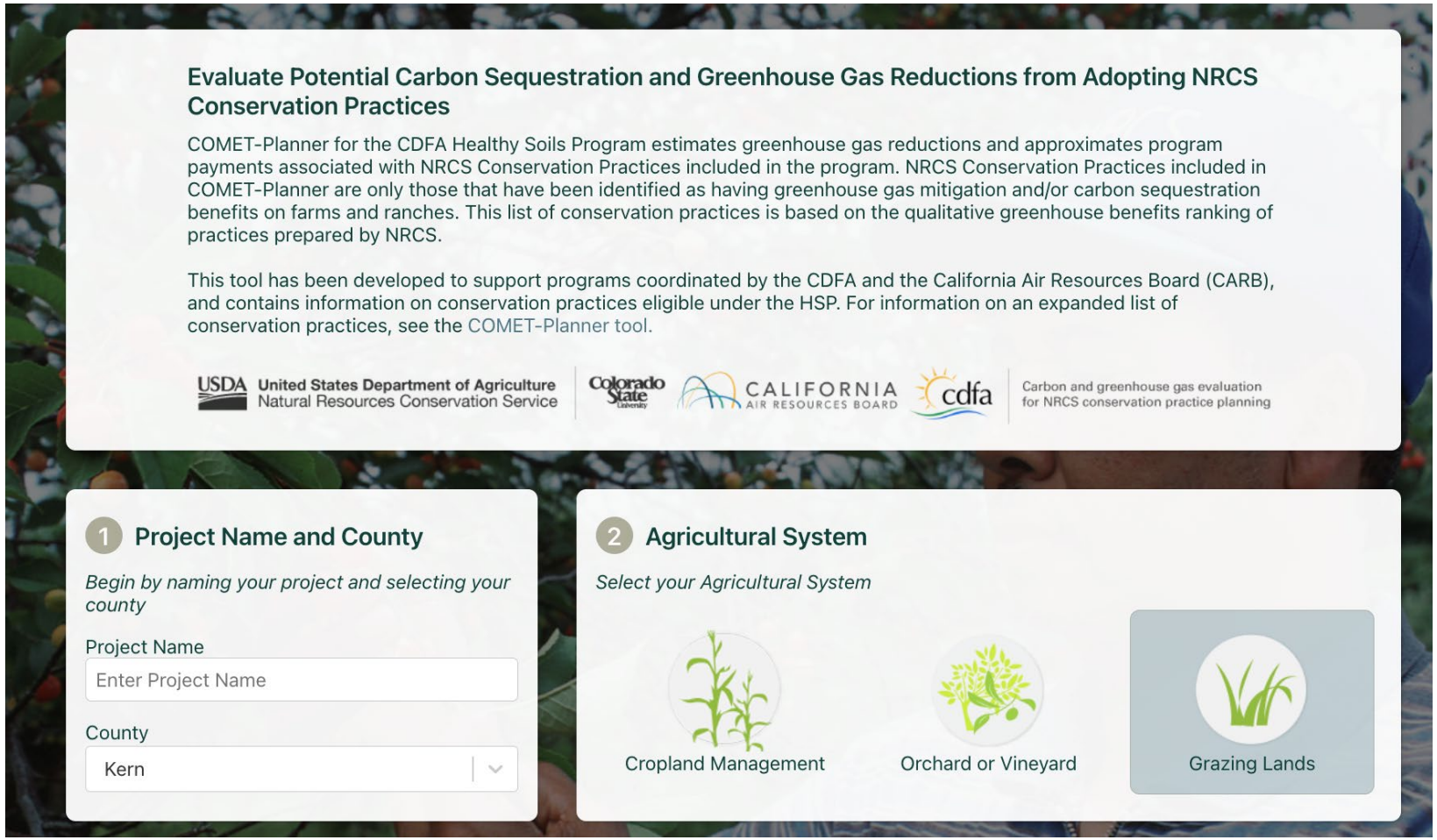
- Improve or maintain soil organic matter.
- Sequester carbon and enhance soil carbon (C) stocks.
- Improve soil aggregate stability.
- Improve habitat for soil organisms.

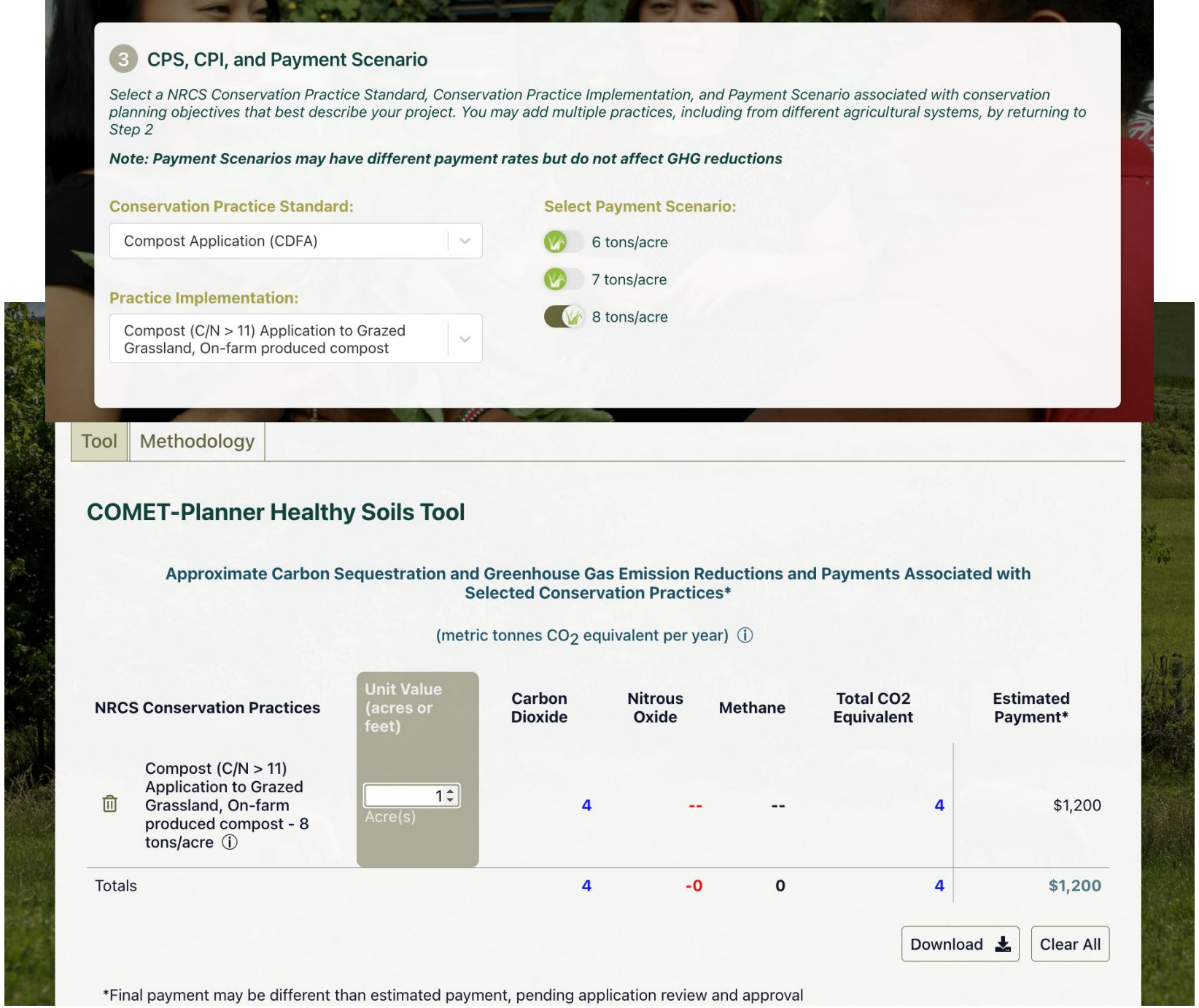
COMET- US Carbon model

- Focus on agronomic crops
  - Cover crops
  - No till
- Limited to no mention of EOM at least prior to Marin Carbon and outside of CA

http://comet-planner-cdfahsp.com/

http://comet-planner-cdfahsp.com/





3 CPS, CPI, and Payment Scenario

Select a NRCS Conservation Practice Standard, Conservation Practice Implementation, and Payment Scenario associated with conservation planning objectives that best describe your project. You may add multiple practices, including from different agricultural systems, by returning to Step 2

Note: Payment Scenarios may have different payment rates but do not affect GHG reductions

Conservation Practice Standard:

Compost Application (CDFA)

Practice Implementation:

Compost (C/N > 11) Application to Grazed Grassland, On-farm produced compost

Select Payment Scenario:

- 6 tons/acre
- 7 tons/acre
- 8 tons/acre

Tool | Methodology

COMET-Planner Healthy Soils Tool

Approximate Carbon Sequestration and Greenhouse Gas Emission Reductions and Payments Associated with Selected Conservation Practices*

(metric tonnes CO_2 equivalent per year) ⓘ

NRCS Conservation Practices	Unit Value (acres or feet)	Carbon Dioxide	Nitrous Oxide	Methane	Total CO2 Equivalent	Estimated Payment*
Compost (C/N > 11) Application to Grazed Grassland, On-farm produced compost - 8 tons/acre ⓘ	1 Acre(s)	4	--	--	4	$1,200
Totals		4	-0	0	4	$1,200

Download | Clear All

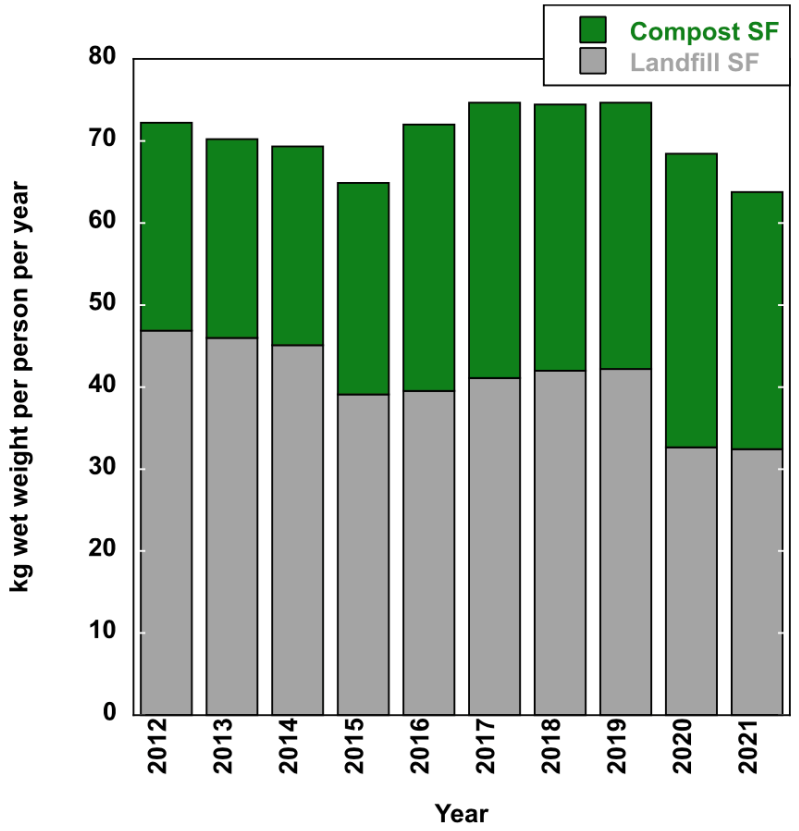
*Final payment may be different than estimated payment, pending application review and approval

Now that you are feeling pretty good
I need to burst your bubble a little bit

https://www.telegraph.co.uk/news/newstopics/howaboutthat/5813506/Photographer-captures-moment-a-bubble-bursts.html

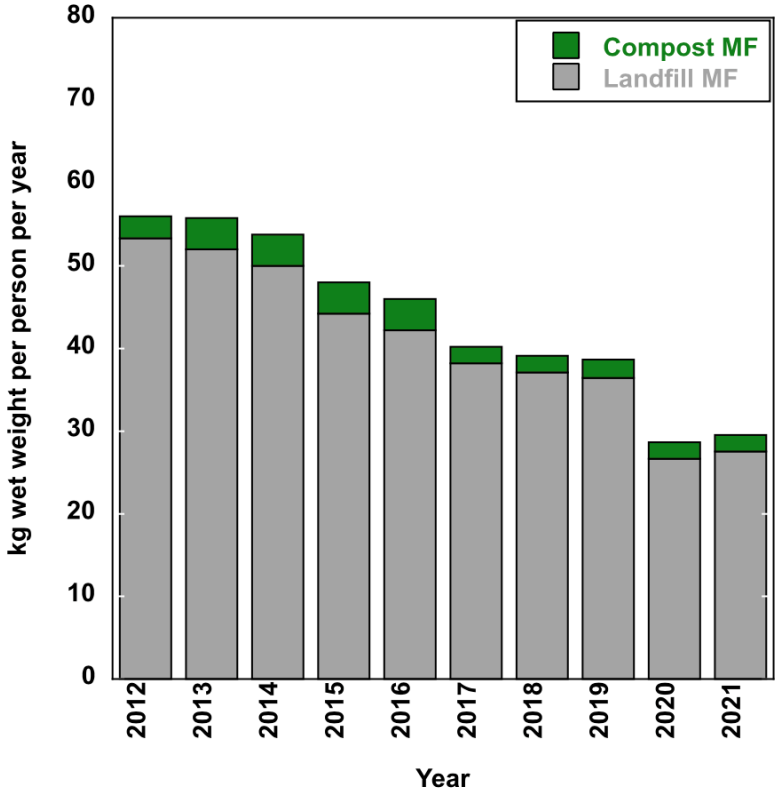
On the books versus in the windrow

- City of Seattle
  - Longstanding > 15 years food/ yard collection
  - High participation rate (SF)
- How does CT compare?



Single family

Multi family



Excedrin headache # 1: Contamination

Waste Dive

[Composters spend about a fifth of operating costs on contamination, including plastic]

The Composting Consortium report, which analyzed feedstock and finished product from 10 facilities around the country, aims to address common assumptions about plastic and other contaminants in compost. (33 kB)

https://www.mill.com/

Zero waste.
Zero work.

Some inventions change our lives.
The dishwasher. The clothes dryer.
And now, Mill — the food recycler that
works while you sleep.

Buy now

Learn more

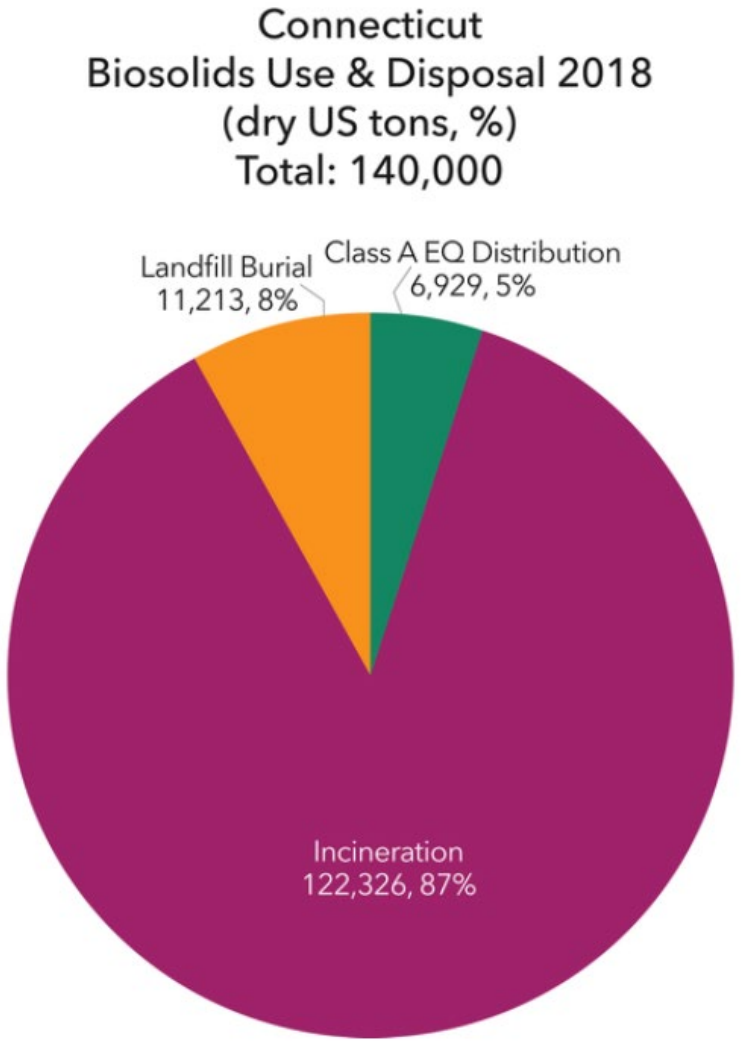
Then there is that other feedstock

Municipal biosolids are much richer in nutrients, more consistent and lower in contaminants than food scraps

PS- food scraps have PFAS too

140,000 dry tons
Most of them crisped

- 122, 326 tons incinerated
  - CO2e = 125,600 MT
- 11,213 tons landfilled
  - CO2e = 29,600 MT



https://www.biosolidsdata.org/connecticut

CT 3.6 million people

- Say 100 wet lbs food waste per person (45 kg)
- Say you have 100% capture
  - (say that I'm 6' tall and a marathon runner)
- 3.6 million people * 45 kg food scraps per person/ 1000 kg per Mg
  = 162,000 tons CO_2e from food scrap diversion

  Burning or landfilling biosolids emits 155,200

Better hurry up and finish lunch- you've got work to do

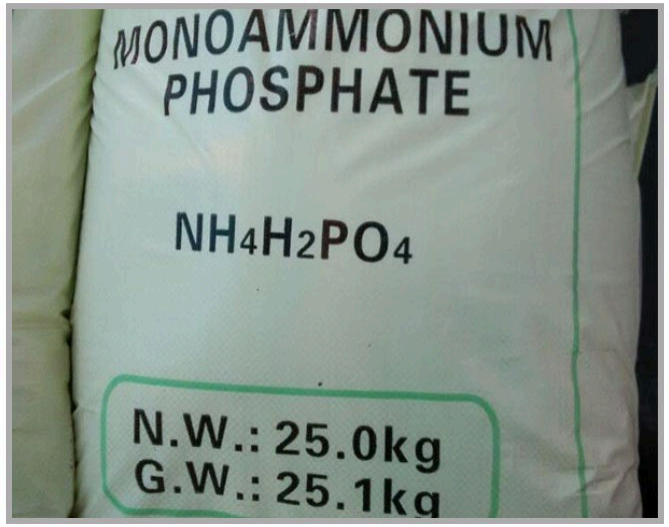
Nutrient Management

‘the only means to confront the decline in reserves (other than conversion from domestic to imported P) is to develop a more coherent and integrated program of P (and other nutrient) re- cycling.’

Amundson et al., 2015 Science

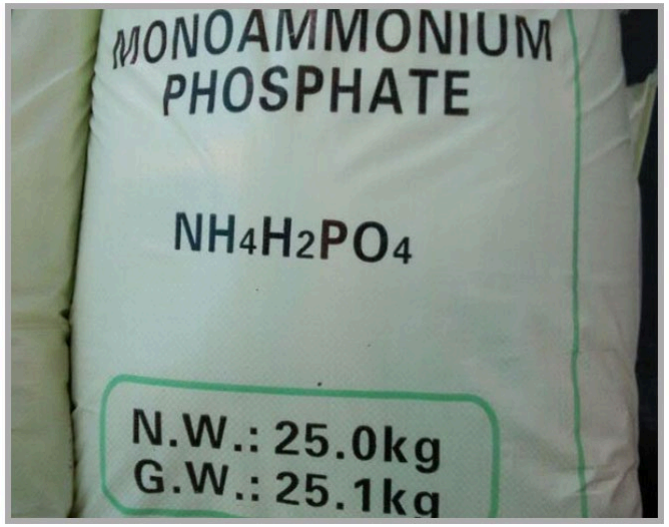
Drawdown says

- Using fertilizers (N) properly (not to excess) can reduce emissions by 2.3-12.1 gigatons (billion) of CO_2
- They recommend the ‘4 Rs’
  - Right source
  - Right time
  - Right place
  - Right time



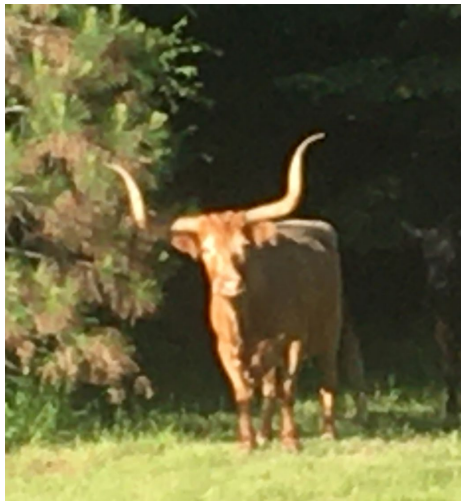
Standard fertilizer

- Nutrients are very carbon intensive to produce
  - 4 kg CO_2 for each kg N
  - 2 kg CO_2 for each kg P



What about people and cows? Take California

- 1.8 million cows
- 54 000 tons of N



https://www.biocycle.net/connections-much-nitrogen-eat/

- 39 million people
- Food scraps = 39 000 tons of N
- Biosolids = 58 500 tons of N

California- our source of fruits, nuts and vegetables

- Uses about 700 000 tons of N fertilizer
- Compost and cow poop could meet about 20% of that demand saving over 600 000 tons of CO_2 annually

Tacoma, WA
Metson et al. (2016)

- Phosphorus in the corn belt

All of the P needed to grow corn is available from local recycled sources