

SOIL HEALTH

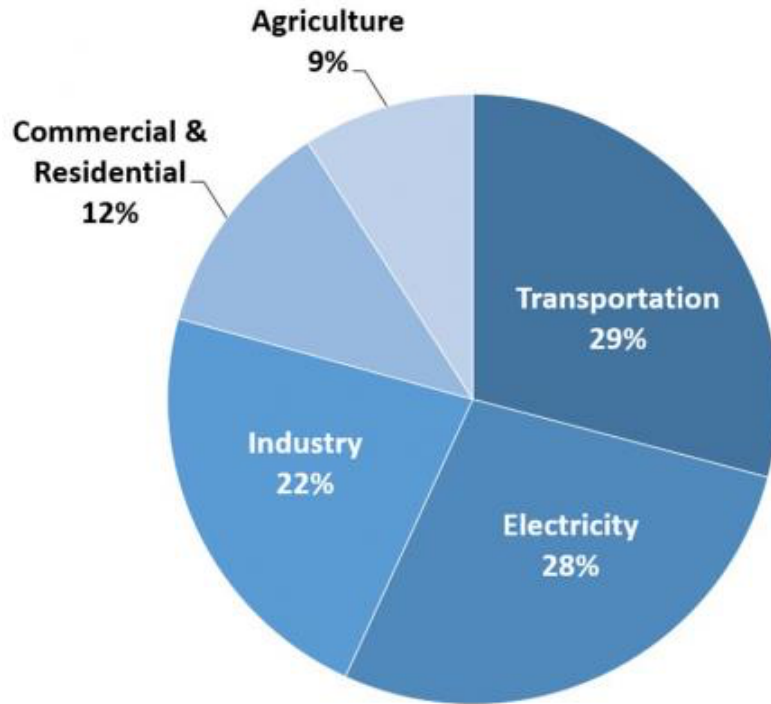
PROMOTING CLIMATE-FRIENDLY AGRICULTURE



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CLIMATE POLICY MUST ADDRESS AGRICULTURE

Total U.S. Greenhouse Gas Emissions
by Economic Sector in 2017



Agriculture contributes far more than EPA's standard number indicates:

- Agricultural chemical inputs are energy intensive, but not included.
- EPA does not include forgone carbon sequestration on already converted lands.
- EPA's assessment undervalues the global warming potency of methane.
- EPA's assessment does not include all agricultural GHG emissions.
- And the full food system — preparing, distributing, cooking/cooling, waste — adds much more.

ALSO, climate-friendly agricultural practices make farms and ranches more resilient to extreme weather and have multiple other benefits such as clean water and air, wildlife habitat and improved producer profitability.

WE WANT TO PROMOTE HEALTHY SOIL, BUT WHAT IS IT?

Healthy soil depends the physical structure of the soil, carbon, nutrients, water, the microorganisms living in soil and their interactions with plants, and the ecosystem services these properties combine to provide.

THIS COMPLEXITY CREATES POLICY CHALLENGES – HOW TO DEFINE? HOW TO MEASURE? CAN WE MONITOR AND PAY FOR?

PHYSICAL STRUCTURE

- TEXTURE
- COMPACTION
- WATER HOLDING CAPACITY

CHEMISTRY

- pH
- CARBON
- NITROGEN
- PHOSPHORUS
- POTASSIUM
- MICRONUTRIENTS

BIOLOGY

- BACTERIA
- FUNGI
- EARTHWORMS
- NEMATODES, ETC.

FUNCTIONS

- CARBON STORAGE AND SEQUESTRATION
- NUTRIENT AVAILABILITY
- WATER QUALITY
- CROP HEALTH AND PRODUCTIVITY

HOW DO WE QUANTIFY SOIL HEALTH?

Policy requires that we can measure what is paid for and often insists that benefits be additional and permanent. But can we measure it accurately enough? Should not preservation of existing carbon stocks and sound practices also be rewarded? And how can anything agricultural be “permanent”?

How can we detect and attribute changes in carbon stocks given wide variation in carbon across space, depth and seasonality?

Dozens of soil cores required per hectare to estimate mean soil organic carbon stocks, and even more to detect changes in stocks.

How do we know if changes in carbon stocks will persist?

The stability and persistence of organic matter depends on many factors:

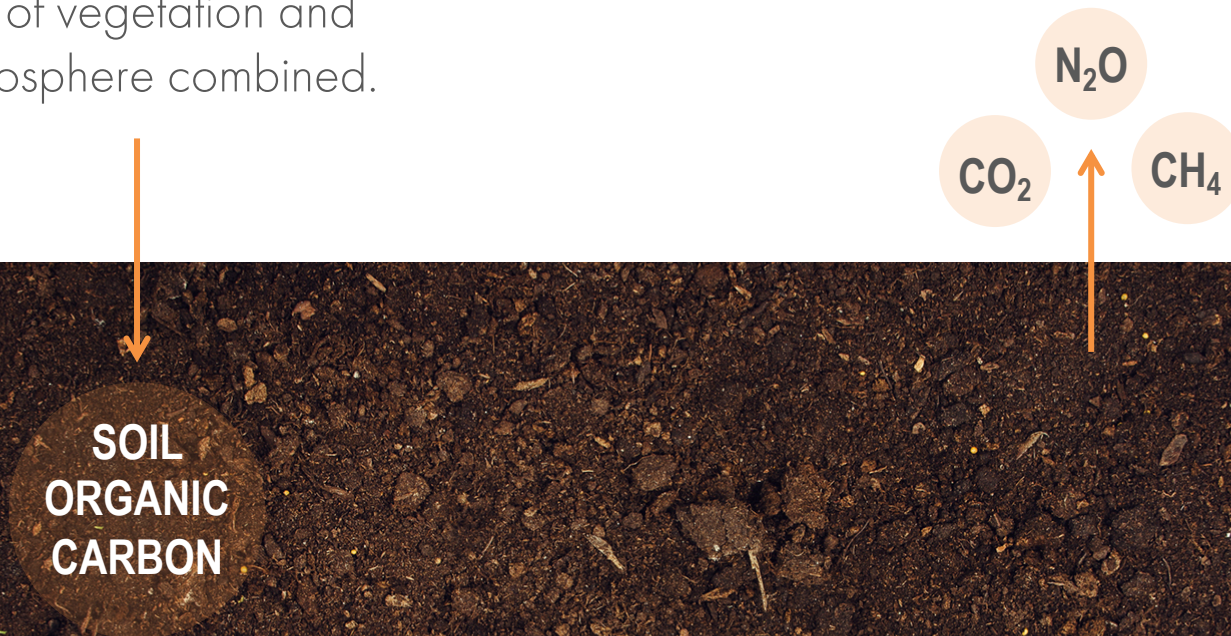
- type of carbon
- aggregates
- microbial use
- temperature
- moisture

HOW DO HEALTHY SOILS IMPACT CLIMATE?

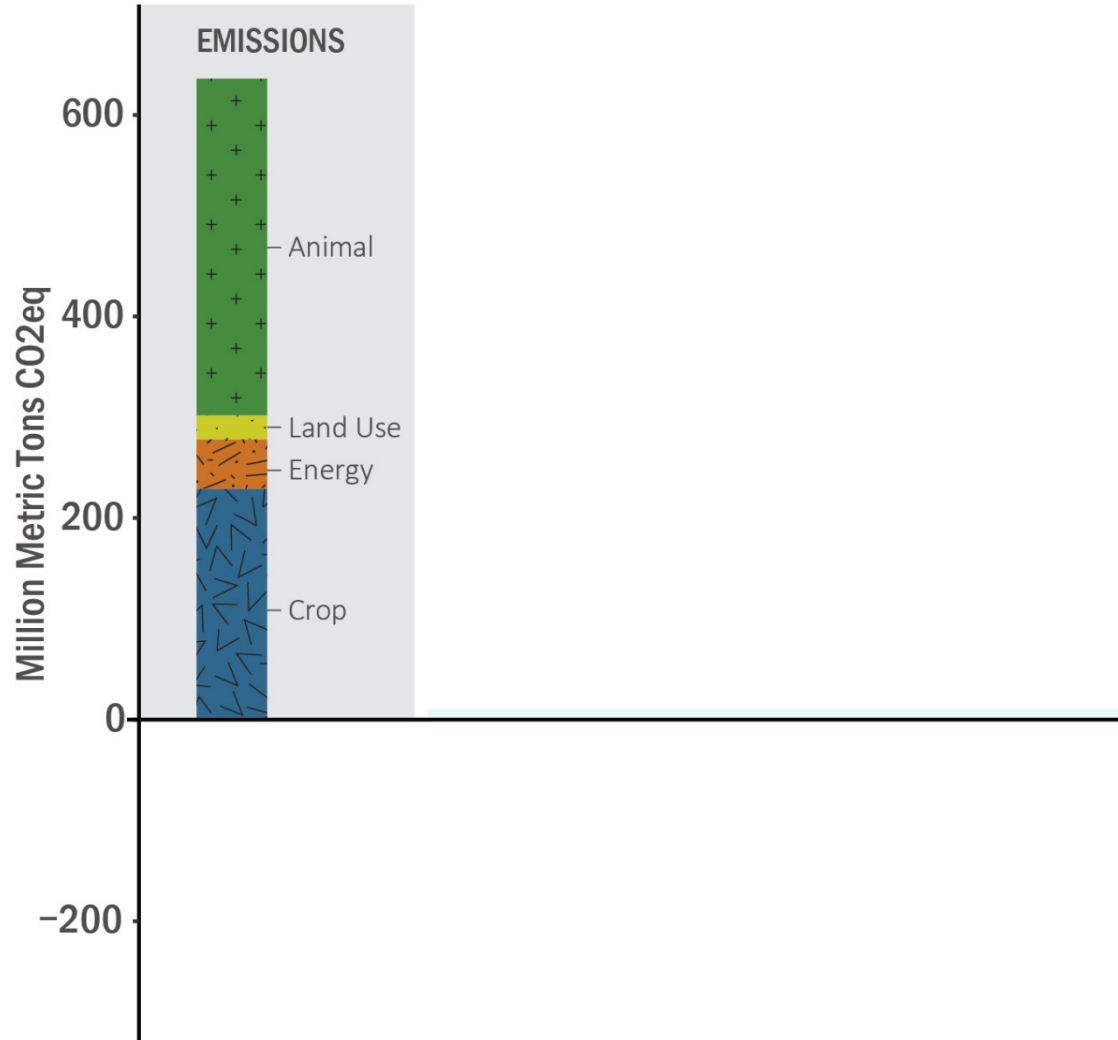
AGRICULTURAL PRACTICES IMPACT THE BALANCE OF STORAGE AND RELEASE

Globally, the upper meter of soil contains more carbon than all of vegetation and the atmosphere combined.

Soils also release greenhouse gases.

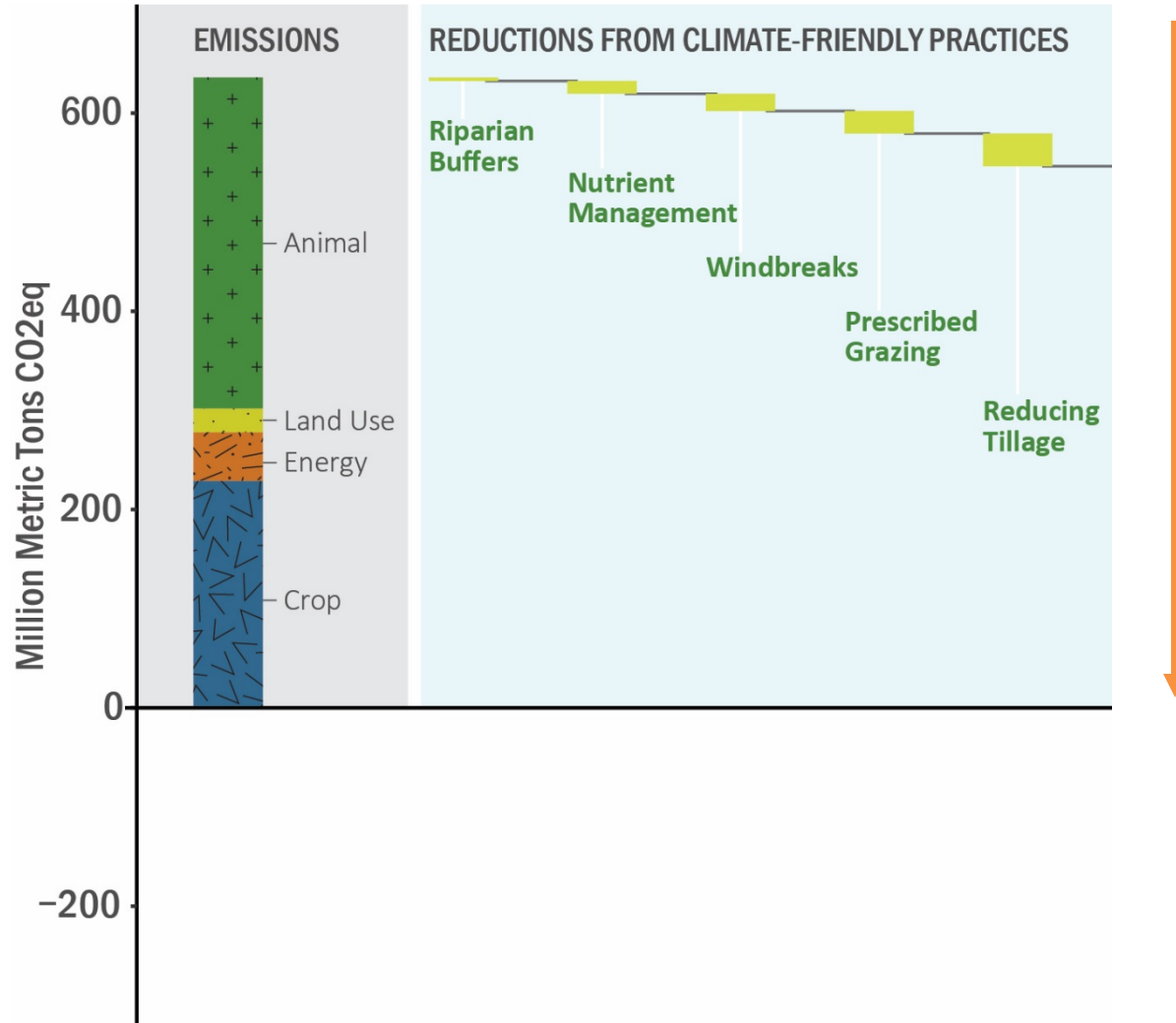


WHY THIS MATTERS: HEALTHY SOIL PRACTICES CAN MAKE AGRICULTURE CARBON-NEUTRAL



Based on estimates from USDA NRCS COMETS planner.

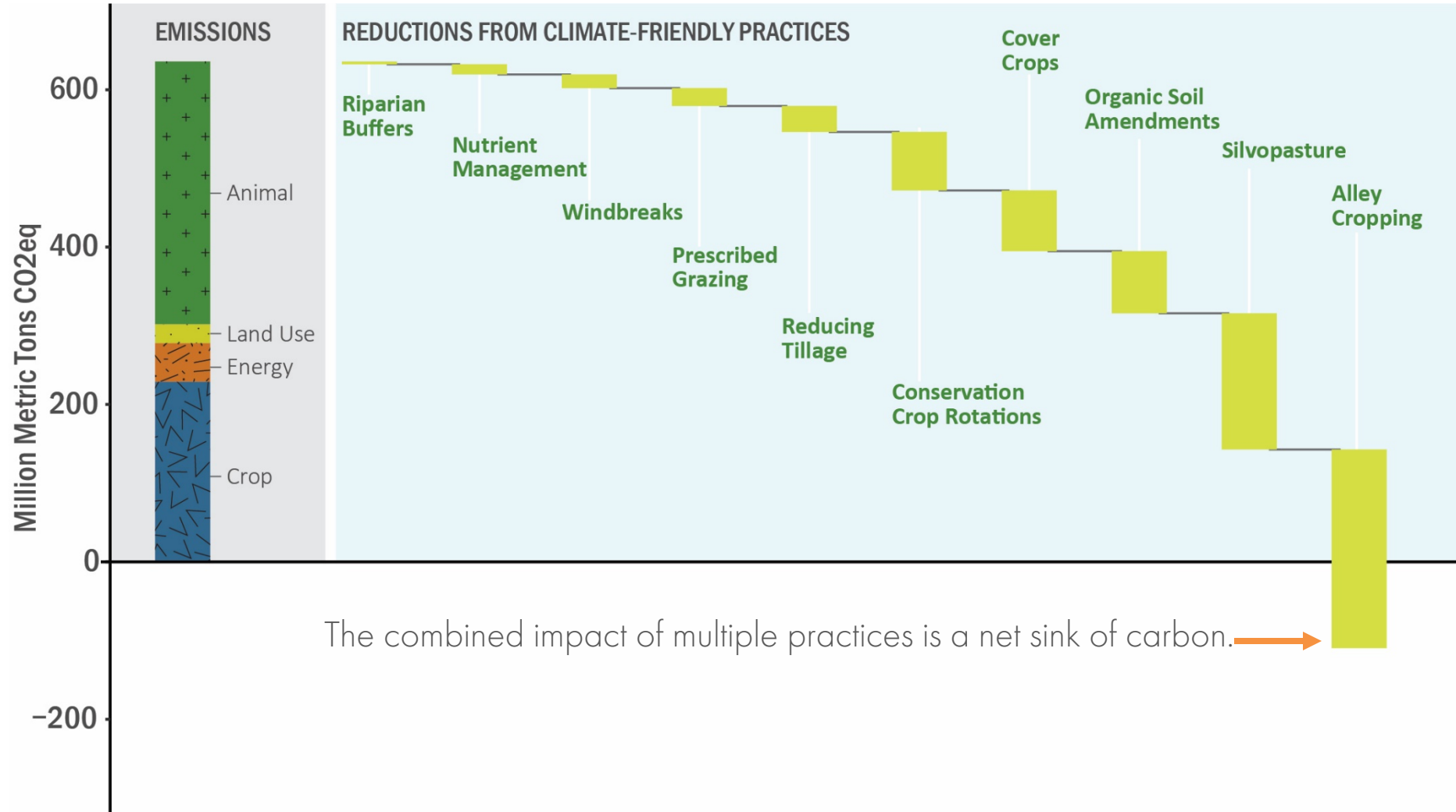
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Each practice counteracts emissions by storing carbon or reducing emissions.

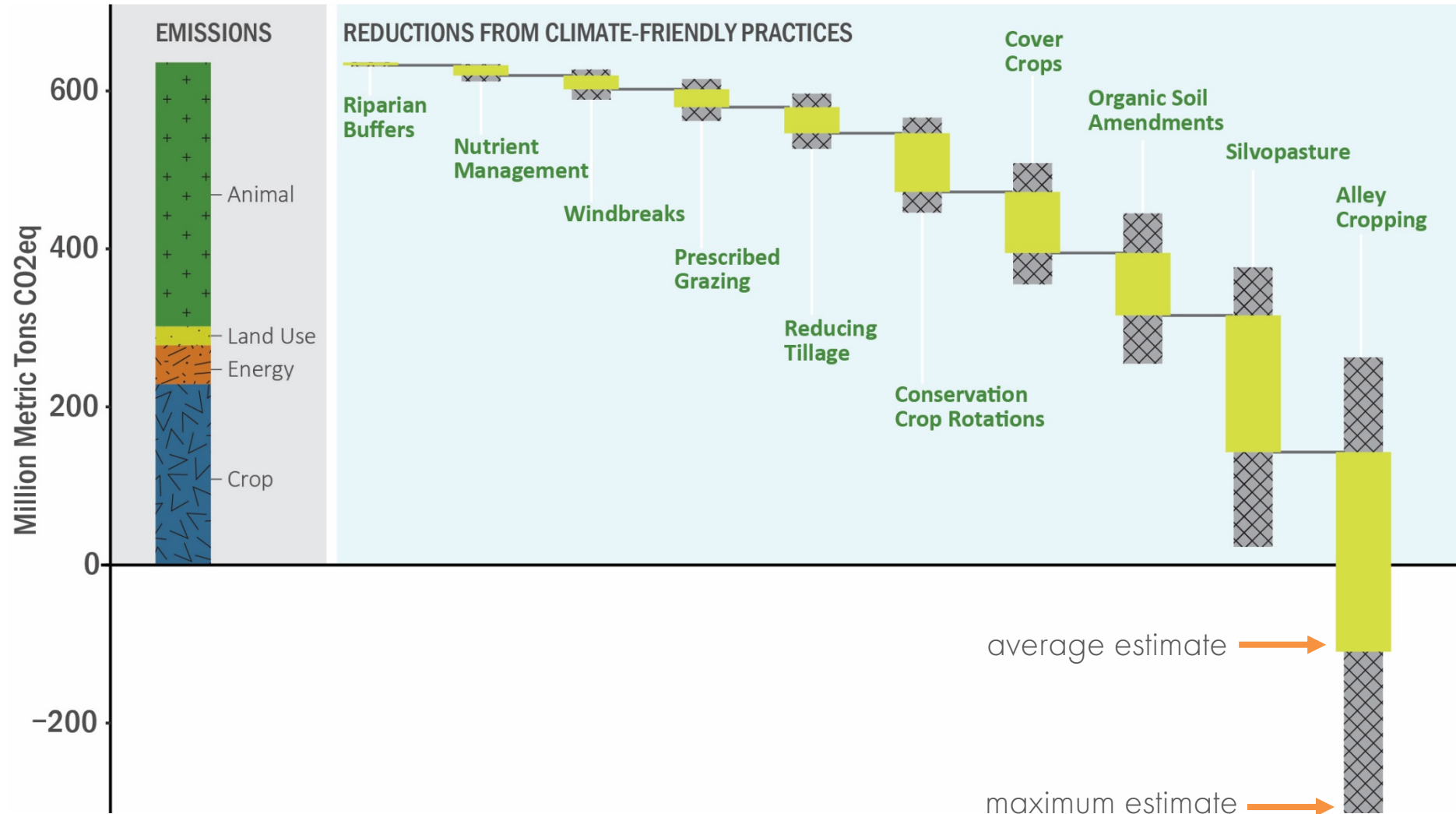
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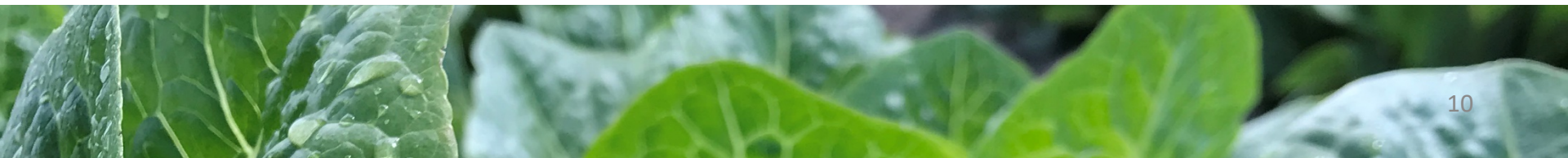


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GROWING CONSENSUS ON WHAT POLICIES ARE NEEDED TO PROMOTE HEALTHY SOILS?

POLICY RECOMMENDATIONS TO THE HOUSE SELECT COMMITTEE ON THE CLIMATE CRISIS

1. Eliminate **policy barriers** to adoption of agricultural land management practices with climate change mitigation potential.
2. **Incentivize practices** with climate benefits.
3. Increase funding **for research and development**.
4. Improve **education, outreach and participation** through federal and state programs.
5. Address **related laws and programs** affecting climate change and resiliency.



GROWING NUMBER OF GROUPS URGING ACTION

- Farm Bureau, National Farmers Union and 19 others just launched “Farmers for a Sustainable Future”
- In NY, very broad coalition joined letter urging legislative action:

Agricultural Stewardship Assoc.	Essex Farm Institute	New York State Vegetable Growers Association
American Farmland Trust	Food and Beverage Law Clinic at Pace University	New York Wine and Grape Foundation
American Sustainable Business Council	Genesee Land Trust	Northeast Dairy Producers Association
AppleSeed Permaculture	Hudson Valley Young Farmers Coalition	Northeast Organic Farming Association of New York
Catskill Mountainkeeper	Land Trust Alliance	Peconic Land Trust
Catskill Young Farmers Coalition	Leatherstocking Young Farmers Coalition	Rochester People’s Climate Coalition
Carbon Cycle Institute	Long Island Sustainable Winegrowing	Rockland Farm Alliance
Central New York Young Farmers Coalition	National Young Farmers Coalition	Saratoga PLAN
Closed Loop Systems LLC	Natural Resources Defense Council	Scenic Hudson
Columbia Land Conservancy	New York Corn and Soybean Association	Tug Hill Tomorrow Land Trust
Cornell College of Agriculture and Life Sciences	New York Farm Bureau	Upper Hudson Young Farmers Coalition
Cornell Cooperative Extension	New York Farm Viability Institute	Western New York Land Conservancy
Delaware Highlands Conservancy	New York League of Conservation Voters	
Earthjustice	New York State Agribusiness Association	
Environmental Advocates of New York	New York State Grange	

GROWING INTEREST IN FEDERAL GOVERNMENT IN PROMOTING HEALTHY SOILS

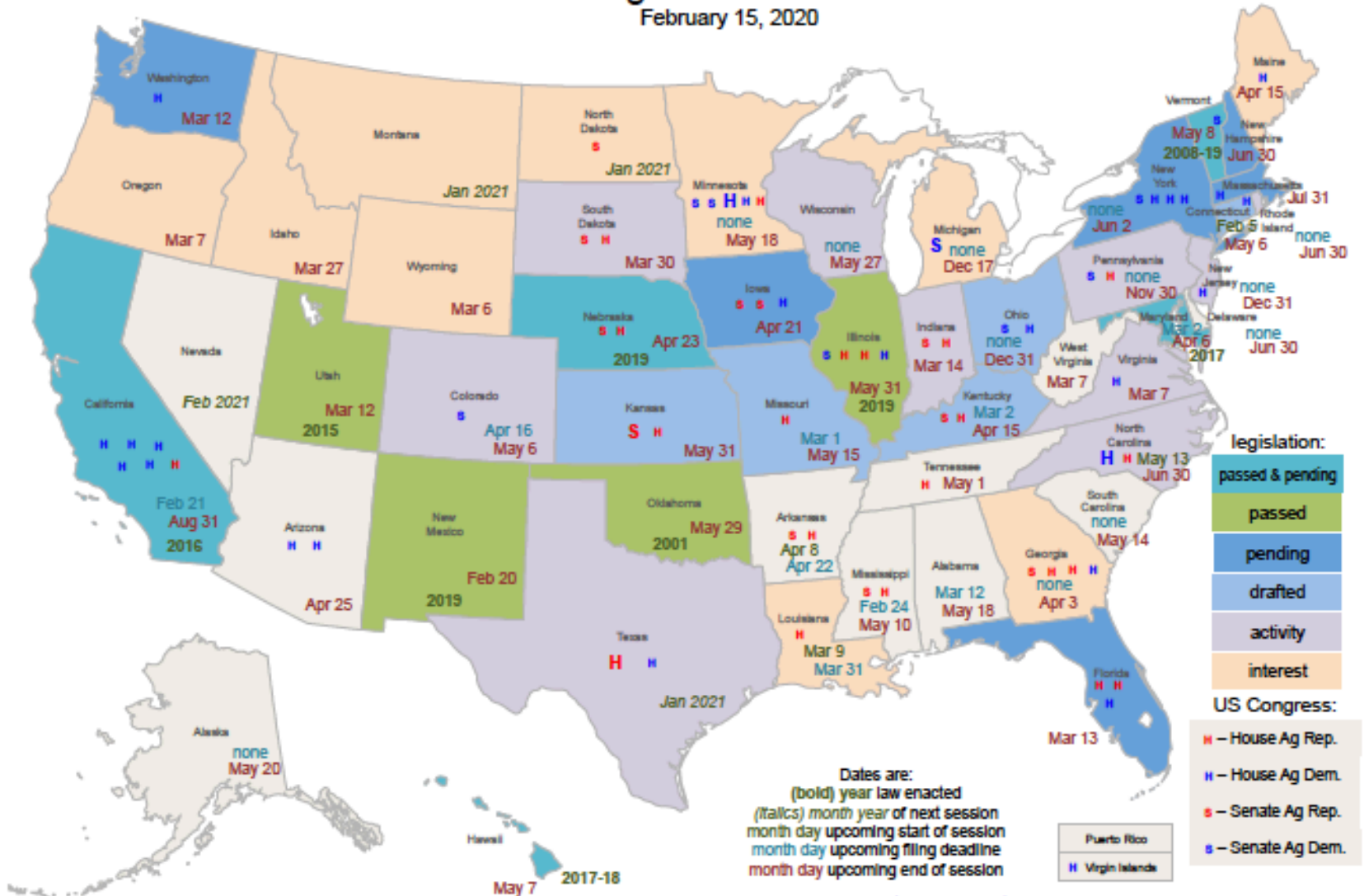
- 2018 Farm Bill contained some healthy soil provisions
- May 2019 Senate Agriculture Committee hearing on agriculture and climate change
- House Select Committee on the Climate Crisis report will address agriculture
- USDA just announced framework for reducing environmental footprint of agriculture (albeit not mentioning climate change)
- Agriculture Resilience Act just introduced

Agriculture Resilience Act, H.R. 5861:

1. **Sets goals** on funding, food waste, year-round cover, advanced grazing, greenhouse gas emissions, on farm energy audits, and renewable energy.
2. **Research & outreach** including regional Climate Hubs, Agroecological Network, regionally adopted breeds and crops
3. **Soil health** improvements to conservation programs, expanding conservation compliance to all states, authorizing regional agroforestry centers
4. **Farmland Preservation**
5. **Pasture-Based Livestock** -- removes barriers and provides incentives
6. **On-Farm Renewable Energy**
7. **Food Waste** -- improves food date labels and supports composting

GROWING INTEREST AT STATE LEVEL TO PROMOTE HEALTHY SOILS

Healthy Soils legislative status February 15, 2020



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THE MOMENTUM IS BUILDING!

