SOIL HEALTH INITIATIVES IN NEW YORK:
BUILDING MOMENTUM

Fishkill Farms, East Fishkill, New York

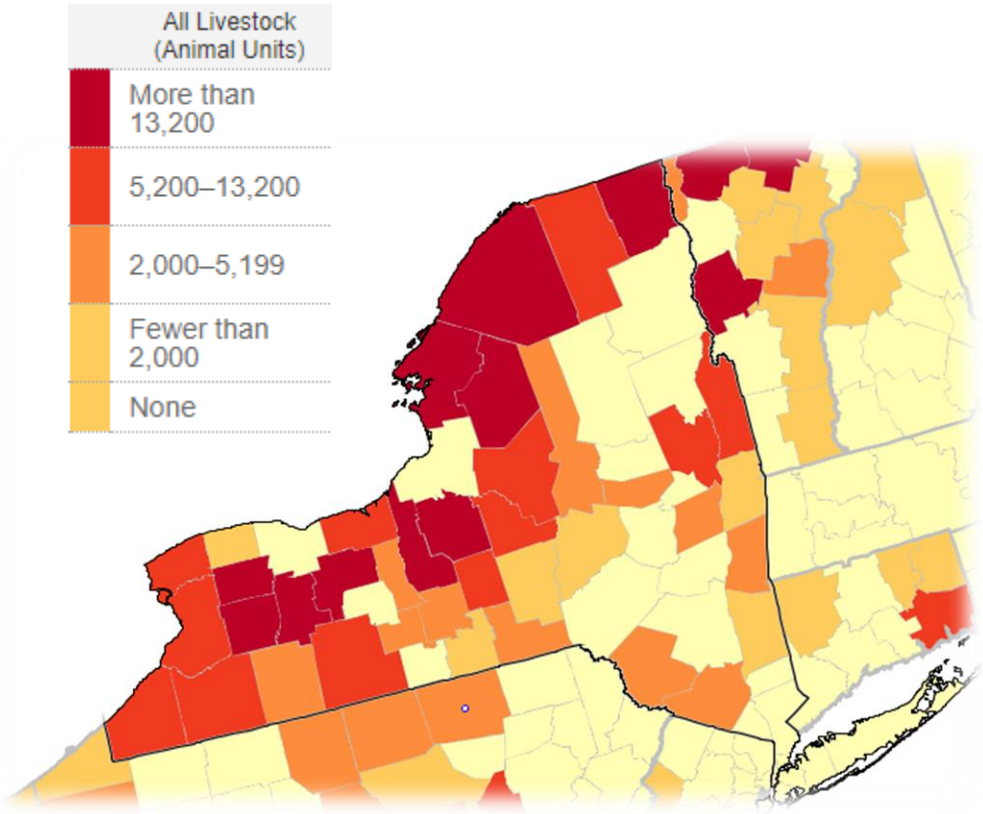
PETER LEHNER

EARTHJUSTICE

ELIZABETH HENDERSON

NOFA-NY
NORTHEAST ORGANIC FARMING ASSOCIATION OF NEW YORK

AGRICULTURE IN NEW YORK STATE: INDUSTRIAL AND CONCENTRATED



- **23%** of land use is agricultural
  - **4.2 million** acres of crops and **2.7 million** acres of grazing land
- **35,500** farms
  - **3%** account for **60%** production (by market value of sales)
- **19,900** operations with animals
  - **3%** produce **85%** of beef cattle, dairy cows, swine, poultry

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

IMPACTS OF INDUSTRIAL AGRICULTURE IN NY

- Harmful algal blooms caused by manure runoff from NY CAFOs
  - Example: 2014 spill in Lake Owasco
- Nitrogen fertilizer contamination
  - **30+** NY drinking water systems/utilities with **>5 ppm** (above health guideline)
- **4%** of all GHG emissions
  - **23%** of all methane; **75%** of all nitrous oxide
- Wildlife habitat loss from cropland conversion
  - 163,000 new cropland acres; 1,381 acres wetlands converted (2008 - 2012)

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

CLIMATE CHANGE THREATENS NY AGRICULTURE

Crop damage in New Paltz, NY after Hurricane Irene (2011)

- Droughts and floods
- Heat waves
  - $24.9M annual loss for NY dairy with projected temp. increase
- Hurricanes and extreme storms
  - $4.5M+ costs for NY farms after Hurricane Irene
- Pests, weeds, disease
  - Stewart's wilt, late blight
- Water supply
- Nutritional value
- Yield reductions

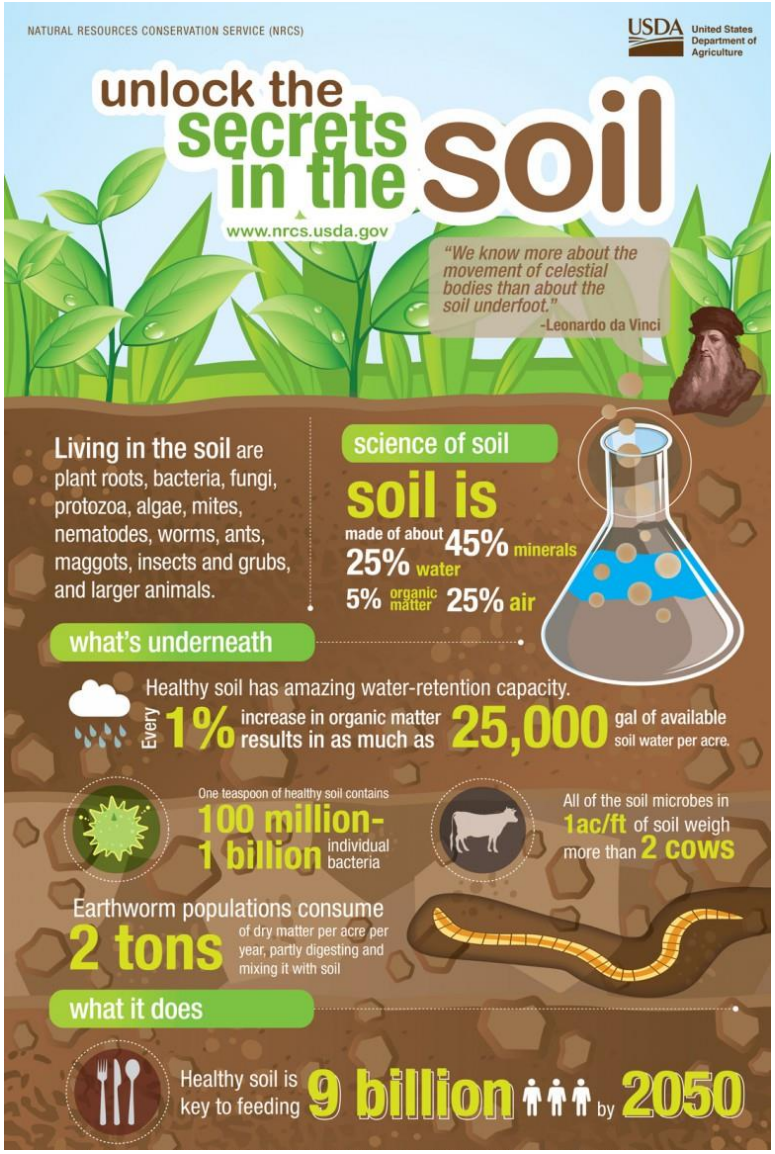
EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

CURRENT AGRICULTURE SYSTEM IS NOT THE ONLY OPTION

- Current system is profoundly shaped by policy (especially Farm Bill; environmental law exemptions)
- Industrial, chemical-dependent monoculture systems are not necessary to "feed the world"
  - Organic and agro-ecological practices are **highly productive**
- The "true cost" of food is **at least double** the market price when include environmental and health costs

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

GOALS OF A **HEALTHY SOIL LAW**



- **Reduce GHG emissions** (CH4, N2O, CO2)
- **Increase soil carbon**
- Support **key soil health principles** (e.g. of NRCS or Rodale Institute):
  - Maximize soil surface cover
  - Minimize disturbance of soil
  - Maximize above- and below-ground diversity
  - Maintain continuous living roots in soil
  - Reduce and limit chemical inputs
  - Incorporate animals on cropland

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

ALTERNATIVE PRACTICES (1): CROPLAND MANAGEMENT

PRACTICE	GHG Reduction	Public Benefits	Private Benefits	Barriers
Crop rotations 	**0.22 – 0.26** Mg CO2e / acre per year	• Reduce erosion • Improve water quality, soil moisture • Soil carbon seq.	• Reduce fertilizer, pesticide, irrigation costs • Economic resilience	• Equipment needs • Labor costs • Market and infrastructure for new crops
Cover Crops 	**0.26 – 0.37** Mg CO2e / acre per year	• Reduce erosion • Improve water quality • Pest suppression • Soil carbon seq.	• Reduce fertilizer, pesticide costs • Reduce on-farm energy use • Improve yield	• Agronomic concerns; interference with cash crop • Equipment needs
No-till 	**0.31 – 0.35** Mg CO2e / acre per year	• Reduce erosion • Improve water and air quality • Prevent soil carbon loss	• Soil health • Reduce fertilizer, irrigation costs • Reduce on-farm energy use	• Agronomic concerns; yield and profitability • Greater herbicide use

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

ALTERNATIVE PRACTICES (2): NUTRIENT MANAGEMENT

PRACTICE	GHG Mitigation	Public Benefits	Private Benefits	Barriers
Improve N fertilizer management 	**0.06 – 0.15** Mg CO2e / acre per year	• Reduce N2O emissions • Minimize water pollution • Improve air quality (reduce odors, PM)	• Improve soil quality • Improve nitrogen use efficiency • Reduce fertilizer input and costs	• Higher costs of technology and equipment needs • Agronomic concerns and uncertainty; yield, efficacy
Organic soil amendments 	**1.00 – 1.75** Mg CO2e / acre per year	• Reduce CH4 and N2O emissions • Minimize water pollution • Improve air quality (reduce odors, PM)	• Improve soil quality • Reduce irrigation and fertilizer costs • Slow release of nutrients	• More expensive than synthetic fertilizer • Agronomic concerns; efficacy • Composting labor and costs

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

ALTERNATIVE PRACTICES (3): ANIMAL MANAGEMENT

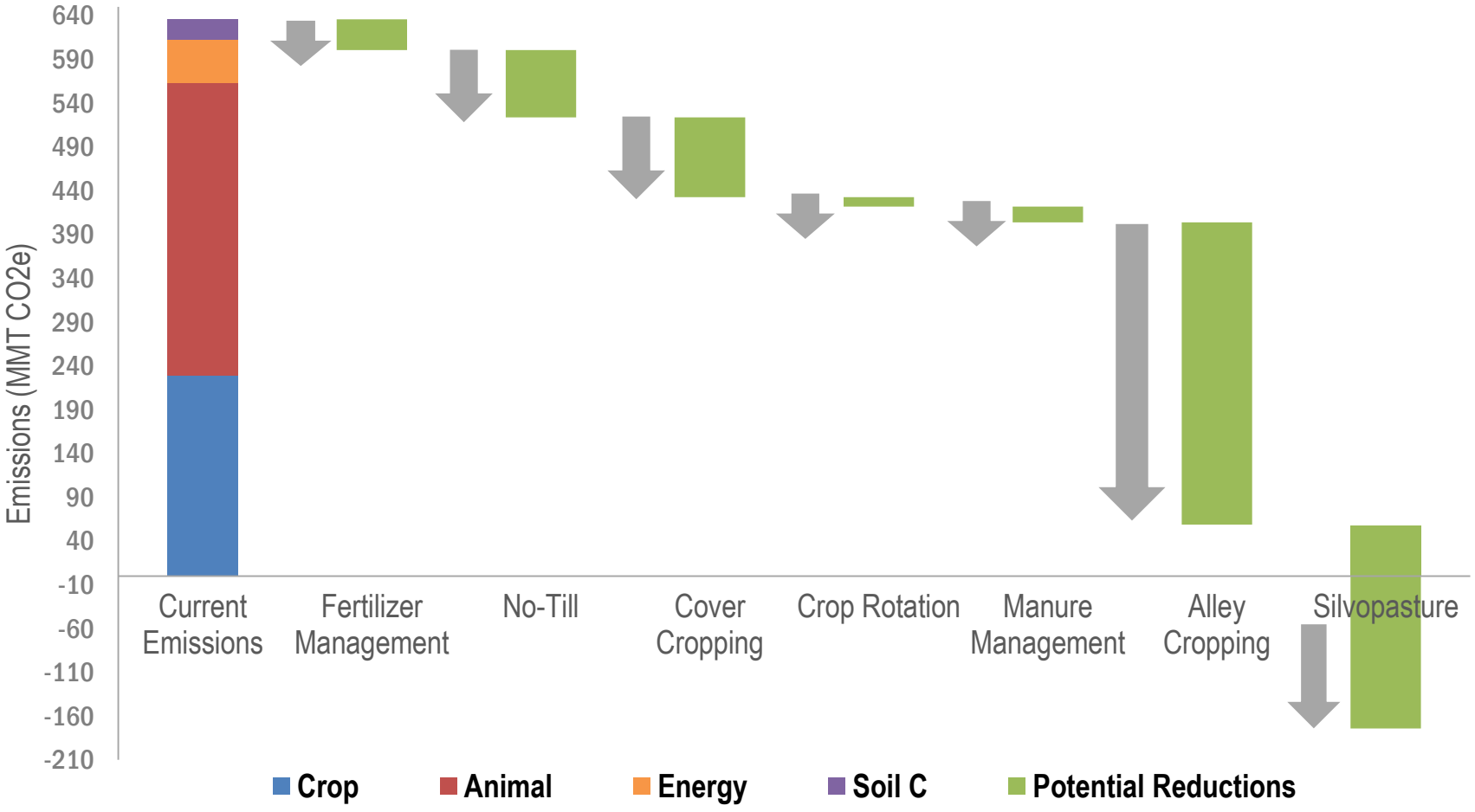
PRACTICE	GHG Mitigation	Public Benefits	Private Benefits	Barriers
Managed grazing 	**0.18 – 0.26** Mg CO2e / acre per year	• Soil health • Prevent overgrazing • Reduce N2O • Soil carbon seq.	• Forage quality • Reduce feed use Weed control • Extend grazing season	• Fencing and labor costs • Production per animal concerns • Land availability
Cropland to pasture 	**0.22 – 0.37** Mg CO2e / acre per year	• Reduce erosion • Minimize water pollution • Prevent soil carbon loss	• New revenue; economic diversity • Forage supply and quality	• Market trends • Fencing, labor, mgmt. costs • Food safety regulations
Dry manure storage 	**N/A** (*see "Organic soil amendments)*	• Reduce CH4 and N2O emissions • Minimize run-off and water pollution	• Less volume than liquid to store • Reduced odors • High nutrient retention	• Labor needs in collection and handling • Equipment needs

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

ALTERNATIVE PRACTICES (4): AGROFORESTRY AND HERBACEOUS COVER

PRACTICE	GHG Mitigation	Public Benefits	Private Benefits	Barriers
Alley cropping 	**0.81 – 1.74** Mg CO2e / acre per year	• Increase water retention and nutrients • Biodiversity • High C storage	• Soil health • Erosion control • Provide shade • Reduce fertilizer needs and costs	• Long return on investment; high initial labor/costs • Management and knowledge
Silvopasture 	**0.66 – 1.34** Mg CO2e / acre per year	• Prevent overgrazing • Improve water quality • High C storage	• Optimize forage and timber production • Provide shade • Weed control	• Regulatory limitations on harvest • Management and knowledge
Buffer strips 	**1.13 – 1.26** Mg CO2e / acre per year	• Reduce nutrient loss, run-off • Improve water quality • Biodiversity	• Soil health • Reduce flooding • Help meet pollution control requirements	• "Hassle" of program (ex. CRP) enrollment • Loss of commodity acres

CARBON-NEUTRAL FUTURE:
BETTER PRACTICES CAN REDUCE EMISSIONS



EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

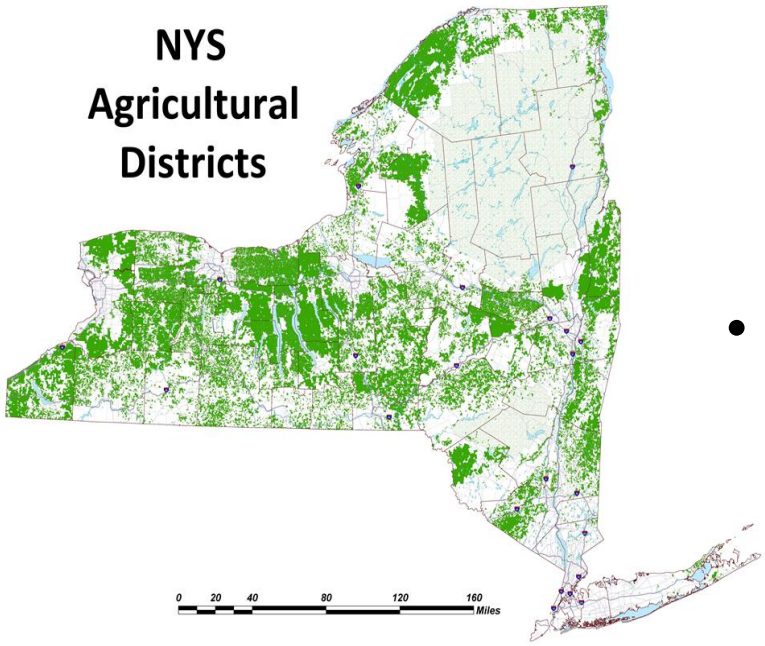
ALTERNATIVE PRACTICES NEED INCENTIVES TO INCREASE ADOPTION

- Agro-ecological practices are very effective, but not widely employed
  - **>85%** of USDA survey participants would NOT adopt structural conservation practices without outside funding

PRACTICE	US	NEW YORK
Cover crops	**3%** of all cropland acres	**5%** of all cropland acres
No-till	**25%** of all cropland acres	**6%** of all cropland acres
Certified organic	**<1%** of all US farms	**3%** of NY farms

**Less than a third of "no-till farms" are truly no-till.*

CURRENT NEW YORK STATE POLICIES AND FUNDING (1)

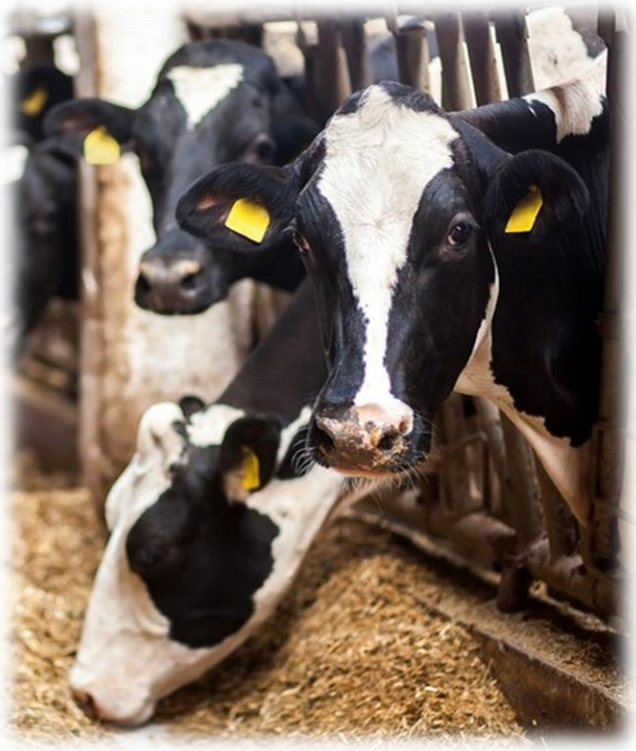


- **Climate Resilient Farming Program (link)**
  - $6 million in funding over past 4 years - most $ to adaptation; could direct more to soil health
  - $2.1M for manure storage
  - $1.9M for water management
  - **$1M for soil health practices** – mostly for ~8,000 acres of cover crops (~$100/acre)

- **2019 State of the State (link):** Governor Cuomo proposes to **double** state funding for the CRF program
  - "Incorporate forest and agricultural carbon into New York's greenhouse gas inventory and climate strategy"
  - Set soil carbon sequestration goal
  - New forestry grant program

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

CURRENT NEW YORK STATE POLICIES AND FUNDING (2)



- **Methane Reduction Plan (link)**
  - Develop on-farm digesters
  - Expand CRF to highlight gas capture
  - Update designs of storage systems; BMP's for animal feeding
- **Climate Adaptation Plan (link)**
  - Climate Smart Communities (no ag yet)
  - Not soil health focused
- **Carbon Farming Act (proposed)**
  - Tax credit for farmers who sequester soil C
- **New York Soil Health Initiative (link)**
  - DAM & DEC contract with Cornell to research practices and policies
  - Stakeholder strategy outlined in "Soil Health Roadmap"

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

POLICIES TO ACCELERATE SHIFT TO CLIMATE-FRIENDLY PRACTICES (1): EDUCATION, OUTREACH AND RESEARCH

NOFA-NY field day at Poughkeepsie Farm Project (2018)

- Knowledge, information and capacity is major barrier for all practices
- Educational and technical support from:
  - Cornell Cooperative Extension
  - NRCS agents and offices in each county
  - Farmer-to-farmer networks
  - On-farm demonstrations and workshops
- **However,** the majority of NRCS funds and grants still support conventional agriculture

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

POLICIES (2): FEDERAL FINANCING

- **Environmental Quality Incentives Program (EQIP)**
  - Funded projects often counter-productive (irrigation, CAFOs)
  - 2018 Farm Bill allows states to provide 90% cost share to 10 “best practices”
- **Conservation Stewardship Program (CSP)**
  - 2018 Farm Bill retained program
  - States can direct toward best practices for organic transition

POLICIES (3): BUFFERS AND EASEMENTS

- **Conservation Reserve Program (CRP)**
  - Program often provides only temporary benefits
  - Accumulated soil carbon is lost when CRP contracts expire and land is put back in production
  - 2018 Farm Bill allows 30-year contracts on pilot basis
- States can expand **Agricultural Conservation Easement Program (ACEP)**

POLICIES (4): OTHER FINANCIAL SUPPORT

- **Market assistance**
  - Assist infrastructure for additional crops
  - Help build market for new crops (e.g. hops; grains for spirits; new or ancient grains through advertising, etc.)
- **Equipment loans**
  - Aid in covering costs of new equipment necessary to implement practices
  - Ex. No-till seed drills for producers
- **Preferential purchasing/promotion**
  - Govt. purchasing could give preference to organic or other climate-friendly food
  - Example: **New York Grown and Certified** (70% people said they would buy more; 50% would pay more)

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

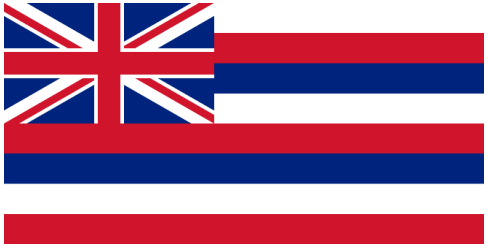
POLICIES (5): ADDITIONAL MECHANISMS

- **Crop insurance**
  - Provide **transition crop insurance** for farmers transitioning from conventional to sustainable practices (e.g. organic, no-till, cover crops)
  - Impose **additional conditions** (e.g. BMPs), on crop insurance, such as expanding the Sodsaver Provision
- Add environmental practice conditions (e.g. BMPs, buffers, cover crops, etc.) on **agricultural district designations**
- Stricter **drinking water protections**
  - Ex. impose limits on CAFO manure spreading

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

EXISTING STATE HEALTHY SOIL LAWS (1)

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



- **Hawaii:** HB 1578 (2017)
  - Identifies, measures, encourages soil health practices
  - Promotes C sequestration, compost, and agroforestry
  - $25,000

EXISTING STATE HEALTHY SOIL LAWS (2)

- **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

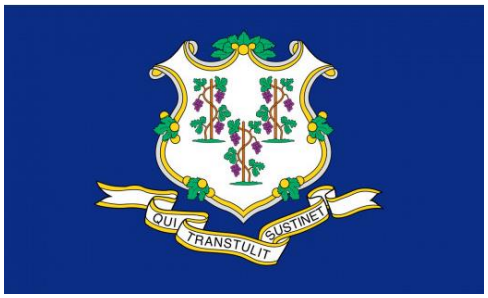
- **Utah:** HCR 8 (2015)
  - Calls on all agencies “with authority to manage lands to increase soil carbon sequestration”

PROPOSED STATE HEALTHY SOIL LAWS (1)

- **Washington:** SB 5947 and HB 2095 (2019)
  - Defines carbon farming as activities that "increase the quantity of organic C in topsoil"
  - Provides grant funding for on-farm efficiency, regenerative ag practices that enhance soil health, agroforestry
- **Illinois:** SB 1980/HB 2737 and HB 2819 (2019)
  - Defines soil health, and includes "conservation of soil health" to Soil and Water Conservation Districts Act
  - Requires soil health practices on land leased for agricultural purposes (Dept. of Natural Resources Act)
- **New Mexico:** HB 204 and SB 218 (2019)
  - Defines healthy soils and ID's practices
  - Includes: soil assessment and education program, healthy soil advisory board, workshops and training
  - Creates "soil health champions"
  - $5.15M for program (FY2020)

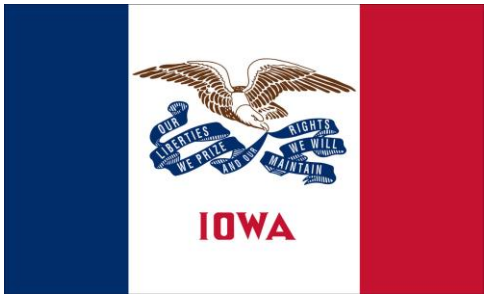
EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

PROPOSED STATE HEALTHY SOIL LAWS (2)



- **Connecticut:** HB 6647 (2019)
  - Defines regenerative agriculture and establishes program to improve soil health and water quality
  - Healthy soils program provides funding, incentives, education, training

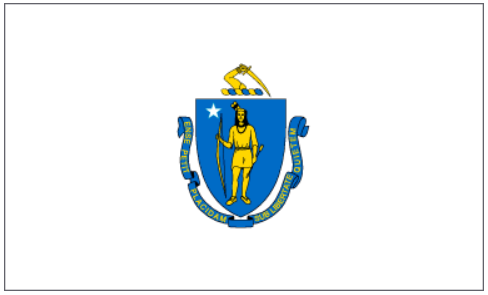
- **Nebraska:** LB 243, LB 729 and LB 283 (2019)
  - Creates Healthy Soils Task Force to develop health soils initiative by 2021
  - Provides incentive of $20-45/acre for planting cover crops
  - $250,000 for soil health and climate change research at University of Nebraska



- **Iowa:** HSB 78 and HF 102 (2019)
  - Establishes property tax exemption for land with cover crops
  - Requires Dept. of Ag and Iowa State University to conduct statewide soil health monitoring

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

PROPOSED STATE HEALTHY SOIL LAWS (3)



- **New York:** A 3281 (2017)
  - Defines carbon farming using USDA COMET-Planner and COMET-Farm
  - Establishes tax credit to encourage C seq.
- **Vermont:** S 43 (2017)
  - Requires the Sec. of Natural Resources to establish a regenerative soils program
  - Incentivizes C seq. with certification and marketing program, technical and financial assistance
- **Massachusetts:** SD 1438 and HD 3065 (2019)
  - Creates Massachusetts Healthy Soils Program
  - Defines and promotes healthy soils practices
- Legislation drafted in **Kansas, Kentucky, Missouri, Colorado, Pennsylvania**

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

State	Water Quality / Quantity Goal	Climate Change Mitigation Goal	Other Goals	"Healthy Soil" Definition	Specific Practices Identified	Committee, Task Force and/or Agencies	Research and Education	Technical Assistance	Funding and Financial Assistance
CA	✓	✓	Yields, erosion, air	✓	No-till, cover crops, compost, grazing	✓	✓	✓	$7.5 M
HI	✓	✓	Resilience, trading	✓	Compost, agroforestry	✓	✓	✓	$25,000 for study
MD		✓	Yields	✓		Dept. of Ag.	✓	✓	
OK		✓	Trading		Trees, conservation, re-vegetation	✓	✓	Measurement	Creates fund
UT	✓	✓	Productivity, biodiversity		Advance forestry, grazing	✓		"Encourages"	
WA		✓	Profitability, energy use	Carbon farming	Trees, no-till, cover crop, grazing	✓			Creates fund
IL	✓		Climate resilience	✓	Perennials				Soil and Water Cons. Districts
NM			Yields, profitability	✓	No-till, cover crops, compost, mulch, grazing	✓	✓	✓	$5.15 M
CT	✓		Erosion,	✓	No-till, cover crops, grazing, integration	✓	✓	Training	Creates fund
NE	✓	✓	Profitability, resilience	✓	Cover crops	✓			$20-40/acre for cover crops
IA					Cover crops		✓		Tax exemption for cover crops
NY	✓	✓	Yields	Carbon farming	Refers to COMET-Planner		✓	Certificate	Tax credit
VT	✓	✓	Climate resilience	Performance based	No synthetic chemicals	✓		Certificate	Marketing program
MA		✓		✓	No-till, cover crops, grazing, integration	✓	✓	✓	Creates fund

POSSIBLE KEY ELEMENTS OF **MODEL LAW**

- **Findings:** Benefits of health soils
- **Define:** Healthy soils
- **Goal:** To increase adoption of practices that create healthy soils
- **Actions:**
  1) Require agencies to consider and coordinate
  2) Identify healthy soil practices and goals
  3) Provide funding for R&D and demonstration projects
  4) Provide education, training, and technical assistance
  5) Provide financial incentives – either payments for practices or tons of carbon sequestered
  6) Work group to propose
  7) Create preferential purchasing and marketing programs and certification programs
  8) Create transition insurance program to help counter risk of adopting healthy soil practices
- **Funding Options:**
  - General funds
  - Fertilizer surcharge, storm water fee, or other impact fee (parallel to environmental benefit charge)
  - Funds from carbon cap and trade program, or carbon fee
  - Redirect federal EQIP, CSP, etc. funds to preference soil health practices

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

ADDITIONAL RESOURCES (1)

- **U.S. Department of Agriculture (USDA)**
  - $15.9M in funding for microbiome research
  - $71M in funding for "10 Building Blocks for Climate Smart Agriculture"
- **USDA Natural Resources Conservation Service (NRCS)**
  - "Unlock the Secrets in the Soil" (link)
- **Regenerative Agriculture Initiative (link)**
  - Supports this definition: "a holistic land management practice that leverages the power of photosynthesis in plants to close the carbon cycle, and build soil health, crop resilience, and nutrient density."
  - Annie's, Cascadian Farms, Ben & Jerry's, Dr. Bronner's, Organic India and Nutiva
- **Samuel Roberts Noble Foundation (link) & the Farm Foundation (link)**
  - Soil Health Institute (link); $200M in funding for agricultural research
- **Soil Health Partnership (link)**
  - Quantify benefits of improved agricultural practices; technical assistance for farmers

ADDITIONAL RESOURCES (2)

- **U.S. Climate Alliance (link)**
  - Helps states achieve climate goals with natural & working lands management
  - Partnership includes: American Farmland Trust, American Forests, C-AGG (see below), The Nature Conservancy, Trust for Public Land, World Resources Institute
- **Coalition on Agricultural Greenhouse Gases (C-AGG) (link)**
  - Multi-stakeholder organization that develops sustainable policies/programs/tools
- **Northeast Organic Farming Association (link)**
  - State chapters in NY, MA, CT, NH, NJ, RI, VT
  - Advocate for organic farming, build community and support for producers implementing organic practices (NOFA Interstate Policy Committee)
- **Foundation for Food and Agriculture Research (link)**
  - Established as part of the 2014 Farm bill with initial $200M funding for R&D
  - Grant opportunities for organizations and universities to advance food and ag science
  - Fosters public-private partnerships

ADDITIONAL RESOURCES (3)

- **CalCAN (California Climate & Agriculture Network) (link)**
  - State-wide coalition of farmers, ranchers, non-profits, scientists, etc.
  - Advocates for policies that support climate-friendly agricultural practices
- **Organic Farming Research Foundation (link)**
  - Grant opportunities and advocacy for organic research, education and federal policies
  - Recipient of $66,000 matching grant from FFAR for research projects on soil health
- **U.S. Dept. of Energy's Advanced Research Projects Agency (link)**
  - $30M in funding for Rhizosphere Observations Optimizing Terrestrial Sequestration program
- **USDA National Institute of Food and Agriculture (link)**
  - $8M in funding for understanding various microbiomes and their effects on food production systems
- **Legal Pathways to Carbon-Neutral Agriculture (report link)**
  - Peter Lehner & Nate Rosenberg (2017). Environmental Law Reporter.