

# Agriculture and the Environment

## An Unsolved Challenge

Environmental Law Institute

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Peter Lehner, Earthjustice



## WHAT DO WE MEAN BY “AGRICULTURE”?

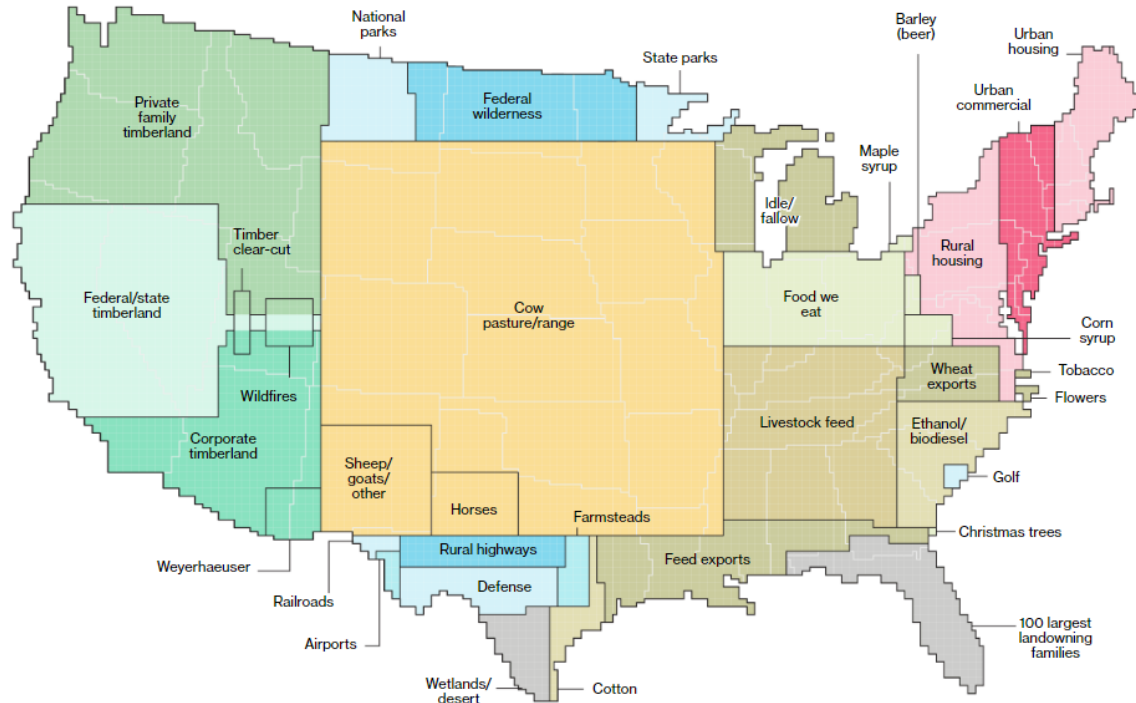
- Growing plants for human use (both directly and as animal feed and fuel or fiber)
- Raising animals for human use
- The first stage of processing plant and animal products
  - Affects on-farm activities; often co-owned
- Does not include: fishing, hunting, marine aquaculture, later stage processing, gardens & lawns, turf (e.g. golf)

# INDUSTRIAL AGRICULTURE PRODUCES A VAST AMOUNT OF INEXPENSIVE FOOD



- **430 bb** lbs food produced annually
- **10 bb** poultry; **170 mm** cows & pigs
- **18,825** animals slaughtered/minute
- **20 mm** bales of cotton, **20 mm** pounds of wool; **14 bb** gallons of biofuel
- **20%** of food produced exported; **15%** imported; **40%** is wasted
- In 2020, Americans paid **36%** less of disposable income for food than 1980
- Farmers receive 7.8¢ / food \$

# AGRICULTURE DRIVES U.S. LAND AND WATER USE



- **62%** of land use in continental U.S. is agricultural
- **391 million** acres of crops and **798 million** acres of grazing land
  - Only **20%** of ag land is used for food we eat
  - Some uncertainty and inconsistencies in data
- **80%** of water use

# INDUSTRIAL AGRICULTURE HARMS THE ENVIRONMENT AND PUBLIC HEALTH



- ### PUBLIC HEALTH
- **Diet-related disease** over \$1 trillion / year
  - **70%** American adults overweight or obese
  - Major source of **lead**
  - Antibiotics in feed -> **antibiotic resistance**



### WATER POLLUTION

- Water pollution & soil erosion **>\$200B/year**
- E.g. Gulf dead zone; Toledo drinking water
- **50 million** Americans drink water contaminated with agricultural chemicals



### WILDLIFE CONFLICT

- Livestock grazing v. wolves & bears
- Loss of habitat – up to **7.8 million acres** converted to cropland between 2007-2012



### TOXIC CHEMICAL EXPOSURE

- Pesticide residues found on **85%** of tested foods
- **17,000** people die each year from ag air pollution

# INDUSTRIAL AGRICULTURE DRIVES AS MUCH CLIMATE CHANGE AS TRANSPORTATION

Agricultural land also contributes to climate change by more than GHG emissions. Agriculture changes evapo-transpiration, field burning releases black carbon, agriculture changes albedo, etc. These impacts not yet quantified.

## SOIL CARBON

- Forest and grassland **conversion**, tillage
- **7.8M+ acres** converted from 2008-2012
- **Continuing impact of prior converted land**



## NITROUS OXIDE

- Corn and other crops
- ~285x stronger than CO2
- Excess fertilizer, animal manure



## METHANE

- 85x stronger than CO2
- Cattle belches (eructation)
- Animal manure (50x human waste)
- Rice, food waste rotting in landfills

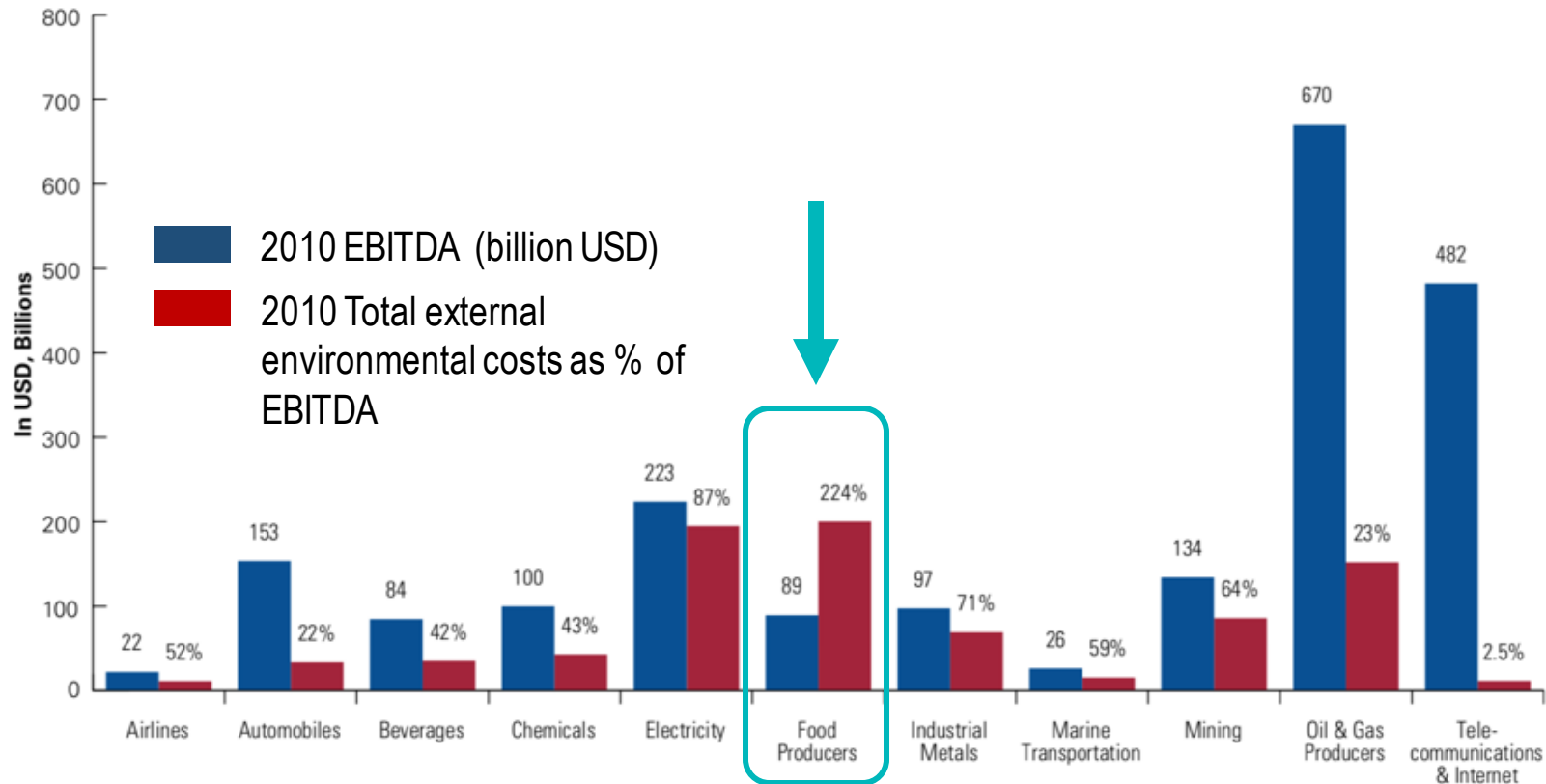


## CARBON DIOXIDE

- Fertilizer and pesticide manufacture
- On-farm energy and electricity
- Food processing, distribution, and preparation



# INDUSTRIAL AGRICULTURE HAS OUTSIZED ENVIRONMENTAL EXTERNAL COSTS



U.S. food industry's environmental externalities are **2.5 times** greater than its revenues; it is the only sector of U.S. economy with true costs > earnings

# CLIMATE CHANGE HARMS AGRICULTURE



## PESTS, WEEDS, DISEASES

- Better living conditions for pests
- Invasive species expand and spread
- Reduced resilience to disease outbreak
- Reduced nutritional content of foods



## EXTREME WEATHER

- Hurricanes and storms increase in frequency and severity
- Hurricane Maria: \$780M in ag losses
- CAFO overflows



## HEAT WAVES AND WILDFIRES

- More frequent and severe
- Lead to yield declines
- Dangerous working conditions



## FLOODS AND DROUGHTS

- Irregular and extreme precipitation events more frequent and severe
- 2021 CA Drought: \$1.2B in ag losses
- 2019 Midwest floods: 5-10M bushels corn and soy rotted; 19M acres left unplanted





# AGROECOLOGICAL PRACTICES REDUCE CHEMICAL USE, POLLUTION, CLIMATE IMPACTS

- Industrial, chemical-dependent monoculture systems are not necessary to “feed the world”
- Organic and agroecological practices are [highly productive](#) and can provide ample nutritious food while reducing fertilizer and pesticide needs
- These include:
  - Perennial crops (*see image*)
  - Crop rotations (different yearly crops)
  - Cover crops (avoiding winter bare ground)
  - No-till, reduced till; prairie strips
  - Management intensive (rotational) grazing
  - Agroforestry & silvopasture (trees)
  - Dry manure management
  - Organic fertilizer



Annual crop root mass (left) vs. perennial crop root mass (right)

**Reducing Impacts:**  
**there are many tools in addition to climate-friendly farming**

### RETHINK LAND USE AND DIET

- Land used for wasteful crops adds up to nearly **the area of Iowa, New Jersey and Texas combined**
- 6 mm acres sweeteners (~NJ)
- Meat production is inefficient (15:1 conversion) and feed production uses >160 mm acres (~Texas)
- Shifting to healthier more plant diets can have big impact



### RETHINK BIOFUELS

- Significant net increase in GHG when factor in land use change and land use
- Land use = 27+ mm acres corn + ~ 25 mm acres soy (~ 2x Iowa)
- PV -> EV is 330x better than crop biofuel

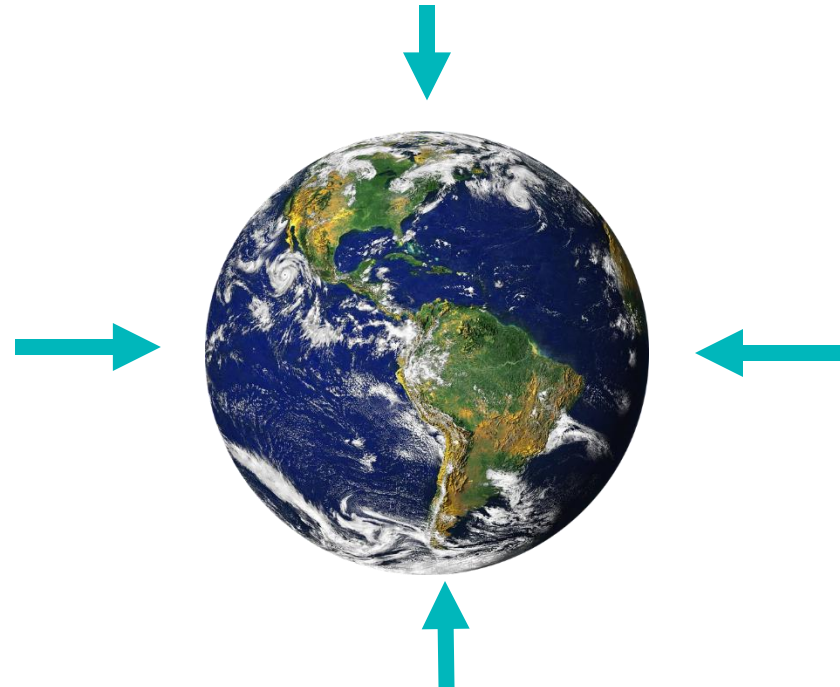


### TECHNOLOGY

- E.g. Blue River Tech. "See and Spray" Robots
- Precise fert. & pest. application reduces total chemical application
- Reduce resistance to herbicide
- Ag Tech grew 4x in 5 yrs
- Breeding
- Genetic modification
- Blockchain
- Indoor/vertical farming
- Alternative meats and milks

### REDUCE FOOD WASTE

- **40%** of food produced in the U.S. is discarded from homes, restaurants and stores
- **\$166 billion worth** of food losses at retail and consumer level



There are  
**very diverse**  
farming  
**practices** in  
the U.S.



**Iowa: Corn**



**California: Vegetables**



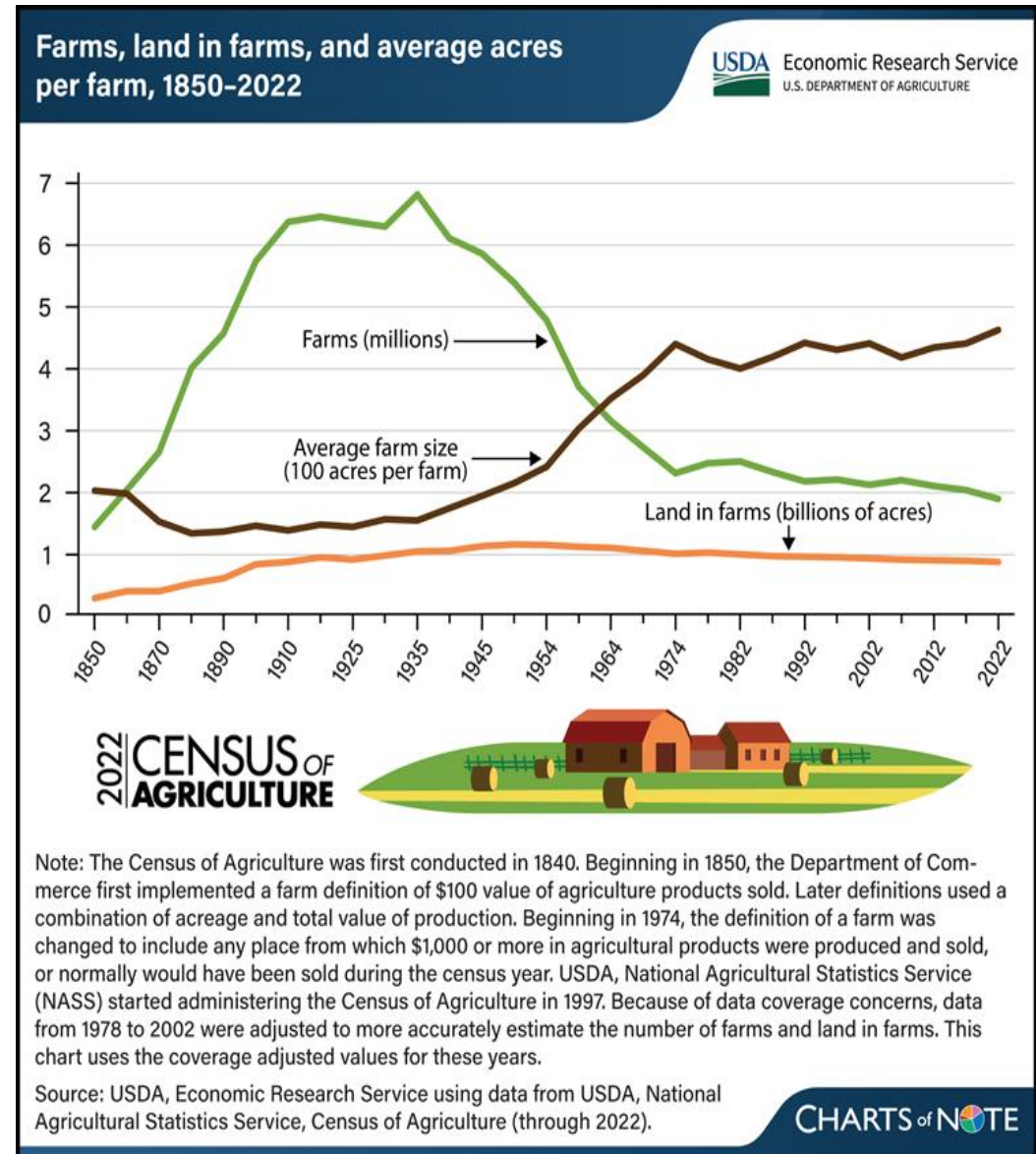
**Florida: Citrus**



**New York: Dairy**

## Industrial Agriculture: Increasing Concentration & Size

- **Industrial production** dominates U.S. agriculture
- **>70%** cropland acres are monoculture
- **6%** of farms produce **90%** of beef cattle, dairy cows, swine, poultry
  - CAFO: concentrated animal feeding operation



# Diverse Farm Ownership And Management

- **Traditional Family Farms**
  - 90% of farms by number; usually small; often limited capital
- **Landlord/Tenant Farming**
  - 54% of cropland is rented
  - 28% of pastureland is rented
- **Partnerships**
- **Corporate Farms**
  - Large scale; Highly mechanized, well-resourced
- **Independent Contractor/Processor**
  - Very common in animal markets
  - Small operators raise animals/products “to spec.”
- **Cooperatives**
  - Aggregation of farmer shareholders
  - Common in sugar, bio-products, dairy



# Environmental Laws Affect Agriculture

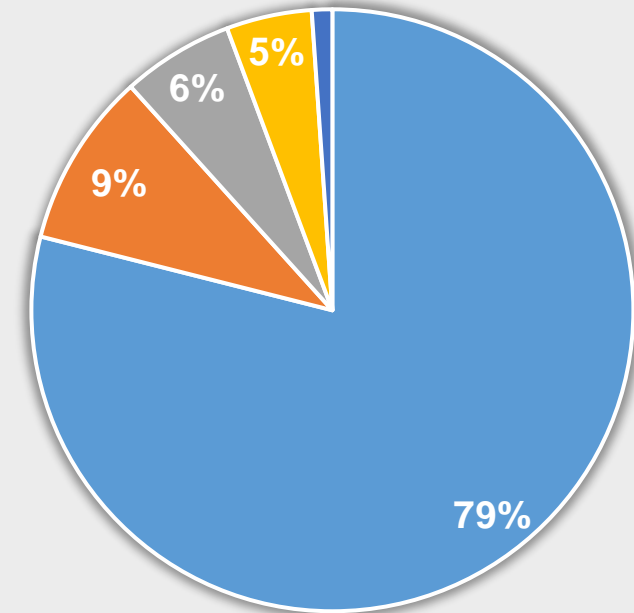
- The Farm Bill
- Pollution control statutes
- Endangered Species Act and state ESAs
- NEPA and state environmental review laws
- Common law (especially nuisance and trespass)
- State laws (e.g. Right-to-Farm, Ag-Gag, land use)
- Water law (esp. in West)(*won't address*)
- Public land laws (FLPMA)(*won't address*)



# The Farm Bill

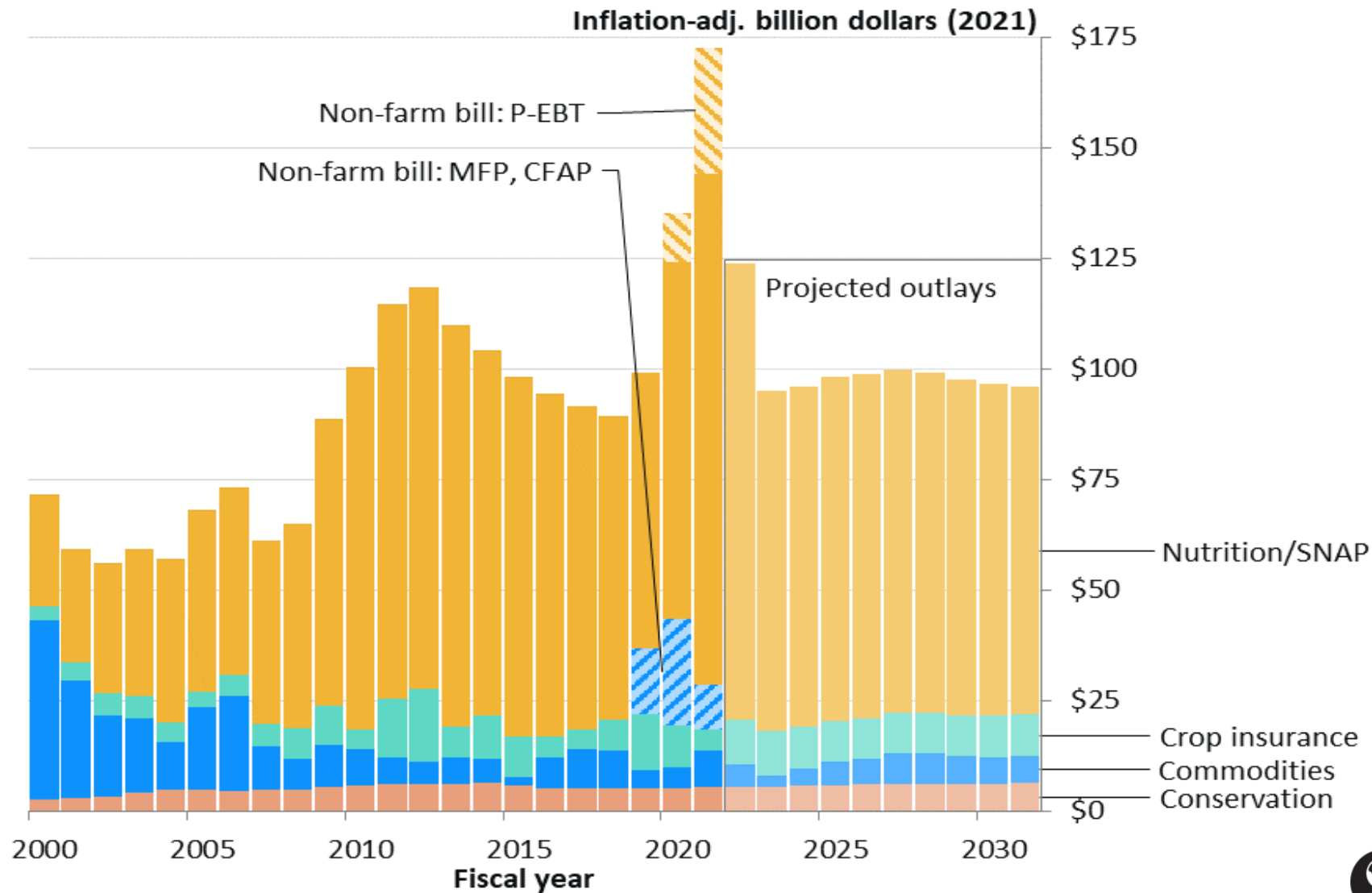
- Approximately **5-year cycle**
  - Last passed in 2018
- Sets the **farming “agenda”**
  - Food stamps/nutrition
  - Counter-cyclical commodity payments --15 major crops; \$6b
    - Payment limits; income caps
  - Crop insurance – 130 crops; \$8b
    - Premium 65% subsidized
  - Conservation compliance
  - Conservation programs – CRP, CSP, EQIP, ACEP, etc.; \$5b
  - FSA loans
  - Commodity Credit Corp; \$25 b

## Costs from FY 2014-2023



- Food stamps and nutrition, \$756 billion
- Crop insurance, \$89.8 billion
- Conservation, \$56 billion
- Commodity programs, \$44.4 billion
- Everything else, \$8.2 billion

# Farm Bill Expenditures: 2000-2030





# The ~~2023~~ 2024 (??) Farm Bill

## 2018 Farm Bill

- House bill first non-bipartisan ever
- SNAP work requirements
- Never mentions climate change
- Largely retained structure with slightly more EQIP and CRP flexibility

## 2024 (?) Farm Bill

- Congress passed one-year extension after failed in 2023
- House ag comm leader says in May
- Senate R maybe after
- Senate D largely drafted?
- Odds do not favor

# Pollution Control Statutes

- **CAA** - Clean Air Act, 42 U.S.C §§ 7401 et seq.
- **CWA** - Clean Water Act, 33 U.S.C §§ 1251 et seq.
- **FIFRA and FQPA** - Federal Insecticide, Fungicide, and Rodenticide Act and Food Quality Protection Act, 7 U.S.C. §§ 136 et seq.
- **CERCLA** - Comprehensive Environmental Responsive, Compensation, and Liability Act, 42 U.S.C. §§ 9601 et seq.
- **EPCRA** – Emergency Planning and Community Right-To-Know Act, 42 U.S.C. §§ 11011 et seq.
- **RCRA** – Resource Conservation and Recovery Act, 42 U.S.C §§ 6901 et seq.
- **TSCA** – Toxic Substances Control Act, 15 U.S.C. 2601 et seq.

# Clean Air Act (CAA)

- No special exemptions for agriculture
- Diffuse nature of many sources of agricultural air pollutants:
  - Farm equipment exhaust
  - Fertilizer application
  - Dust and particulates (including stubble burning)
  - 30,000 CAFOs (ammonia, hydrogen sulfide, methane)
- Ambient metrics (NAAQS) and point source regulations
  - Petitions to list NH<sub>3</sub> as criteria; CAFO as category; H<sub>2</sub>S as HAP
- Title V: facilities over threshold of criteria pollutant need permit
  - 2005 consent decree to develop EEMs
  - Petitions to list NH<sub>3</sub> as criteria; CAFO as category; H<sub>2</sub>S as HAP
- Mobile farm equipment: reg proposed in 2014; vacated 2015
- State regulations through State Implementation Plans
  - E.g. SJV PM 2.5 non-attainment, disapproval, withdrawal
- EPA has broad authority to regulate nitrous oxide as ozone depleter

# Clean Water Act (CWA)

- Agriculture treated differently under the CWA
- Jurisdiction: WOTUS (*e.g.*, ditches, isolated wetlands)(*Sackett*)
- Goal: attain water quality standards; challenge: nutrient WQC
- Wetlands: 404 Permit; farming, silviculture & ranching exemptions
- Point sources: NPDES Permitting
  - CAFOs listed in CWA, but courts required active “discharge”
  - Exemptions for agricultural stormwater, return flows from irrigated agriculture, agronomic rate manure application
  - NPDES ELGs require nutrient management plans
- Non-point source pollution
  - Sections 208 (dormant); 319 (mostly grants)
  - Impaired water lists; TMDLs; WLA + LAs
  - *E.g.*, Lake Erie, Chesapeake Bay, and the Gulf of Mexico
- Groundwater: largely not covered (but Maui case)
  - Extensive nutrient and pesticide contamination

# CERCLA & EPCRA

- Create broad liability for releases or threatened releases of hazardous substances (CERCLA)
  - Hazardous substances associated with agriculture (*e.g.*, chemicals)
  - *E.g.* former farmland contaminated with arsenic
- Require reporting of releases of hazardous substances over thresholds to federal, state, local governments and the public
  - EPA exempted CAFOs; Waterkeeper decision vacated; FARM Act amended CERCLA; EPA continued exemption under EPCRA; rule remanded to EPA
- Application of pesticides, if applied according to the label, exempt
  - Does not exempt spills or misuse
- Growing concern for PFAS contamination of farmland (often from biosolid spreading)

# FIFRA & FQPA

- FIFRA: EPA regulates the distribution, sale and use of pesticides “[t]o the extent necessary to **prevent unreasonable adverse effects on the environment....**”
- FQPA: Food tolerances for pesticide residues: “**reasonable certainty of no harm**”
- EPA must complete registration review by October 1, 2022, for all pesticides registered as of October 1, 2007
- Supplants some otherwise-applicable federal chemical regulations
- Pre-emption of many state/local regulations re: labels, but states may (and often do) impose additional use restrictions
- Does not pre-empt Endangered Species Act
  - Settlement for quicker and more ESA review

# Resource Conservation and Recovery Act (RCRA)

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- Agricultural generates wastes – does it have value?
- Is manure “valuable fertilizer” or RCRA “solid waste?”
- Manure is a RCRA solid waste when applied at greater than agronomic rates, effectively constituting “disposal
- Application to silage and other plant and animal byproducts
- Solid waste presenting an imminent and substantial endangerment to health or the environment may be subject to RCRA section 7002 citizen suits and RCRA Section 7003 government enforcement actions

# Toxic Substances Control Act (TSCA)

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- TSCA excludes from the definition of “chemical substance” any pesticide regulated by FIFRA and any food regulated by the Federal Food, Drug, and Cosmetic Act
  - A chemical subject to FIFRA when used as a pesticide may be subject to TSCA when used for a non-pesticide purpose
- Inert ingredients are subject to TSCA until they are incorporated into pesticides (and regulated by FIFRA)
- TSCA risk management rules may impact agricultural operations that use chemicals found to present an “unreasonable risk to health or the environment”
- Agriculture operations may be subject to TSCA Chemical Data Reporting rule requirements



## NEPA

- Applies to agricultural activity on federal lands; e.g. timber, grazing
- Not applicable to Farm Bill, CAA or CWA permitting, but to Farm Bill rules
- Overarching review of GMO products under the “Coordinated Framework”
- Even if NEPA does not apply directly, may apply indirectly if there is federal financing or other federal component

## ESA

- No special exemptions for agricultural activities
- Large effect on species due to extensive land and water needs of agriculture
- ESA Section 7 consultation (e.g., EPA and pesticides)

# State and Common Law

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- States can impose water permits on non-discharging CAFOS (e.g. NY)
- States can impose stricter limits on pesticides (e.g. CA, NY)
- State consumer protection laws re greenwashing (e.g. NYAG v JBS)
- Nuisance actions against CAFOs
  - But right to farm laws largely limit state CL
  - CWA largely displaces federal CL
- Failure to warn actions regarding pesticides
  - Many successful cases v Roundup
  - Industry efforts to preempt

# Recent Congressional and Biden Administration Actions

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- Inflation Reduction Act
  - ~\$20 billion for practices that reduce or sequester GHG
  - ~\$14 billion for rural coop clean energy
  - Debt relief for “socially disadvantaged” farmers replaces Justice for Black Farmers Act
- \$3.2 billion for Climate-Smart Agriculture & Forestry
  - 70 projects (most include universities to ensure verifiability) (no digesters)
  - Upcoming second round
  - What is “climate-smart”?
- Commodity Credit Corporation? Carbon payments?
- Growing Climate Solutions Act: Voluntary carbon markets promoted
- Manure digesters & “renewable natural gas”
- Natural climate solutions and carbon capture/sequestration
- Reversing Trump Rules (pesticide AEZ; chlorpyrifos, )

# State and Local Efforts to Limit Agricultural Pollution

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- States' climate programs can affect ag, especially CAFO methane
- State and local procurement of more climate-friendly food
  - Good Food Purchasing Program
  - NYC climate assessment
- State and local climate action plans
- State and local efforts to reduce food waste (e.g. bans on organics in landfills; education; food services)

# Local Initiatives on Food Waste and Plant-Based Proteins

LINDA K. BREGGIN

DIRECTOR, CENTER FOR STATE AND LOCAL GOVERNANCE

ENVIRONMENTAL LAW INSTITUTE



# ELI's Center for State and Local Governance

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ELI's Mission is to foster innovative, just, and practical law and policy solutions to enable leaders across borders and sectors to make environmental, economic, and social progress.

The **Center for State and Local Governance** builds the capacity of local governments, NGOs, and other stakeholders to address sustainability issues, through:

- Model governance tools and resources based on extensive best practices research;
- Publications, podcasts, and blog posts; and
- Convenings, webinars, and educational programming.
- Examples: [A Toolkit for Incorporating Plant-Based Protein Measures in Municipal Climate Action Plans](#) (2024), [Model Executive Order on Municipal Leadership on Food Waste Reduction](#) (2023).

# Local Government Legal Landscape

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**Number of Local Governments:** 38,000+ county, township and municipal governments in the US

## **Varied Governance Structures and Tools**

- E.g., Mayor-Council, Council-City Manager, Town Meetings
- E.g., Ordinances, Executive Orders, Regulations

## **Varied Scopes of Authority**

- Dillon Rule vs. Home Rule

## **State Pre-emption**

- Increase in Republican-controlled state legislatures pre-empting Democratic-led cities' initiatives—particularly common in the South (e.g., Austin, Nashville, Raleigh)

# Local Government Actions to Reduce Food Waste: Driving Factors

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## ECONOMIC

- Lowers municipal solid waste management costs;
- Reduces the need to expand and create new landfills; and
- Creates composting industry jobs/reduces costs of irrigation and fertilizer use (if food scraps are recycled and compost is used).

## ENVIRONMENTAL

- Reduces methane emissions (landfills) and carbon dioxide emissions (incinerators);
- Conserves resources that would otherwise be used to produce wasted food; and
- Reduces the need for environmentally-harmful pesticides and fertilizers (if food scraps are recycled and compost is used).

## SOCIAL

- Reduces public health impacts of landfills and incinerators, which are disproportionately sited in low-income communities and communities of color; and
- Addresses food insecurity when surplus food is rescued and distributed to those experiencing food-insecurity.



# Examples of Local Government Food Waste Reduction Measures in Three Categories

## Categories of Actions

### Food Waste Prevention

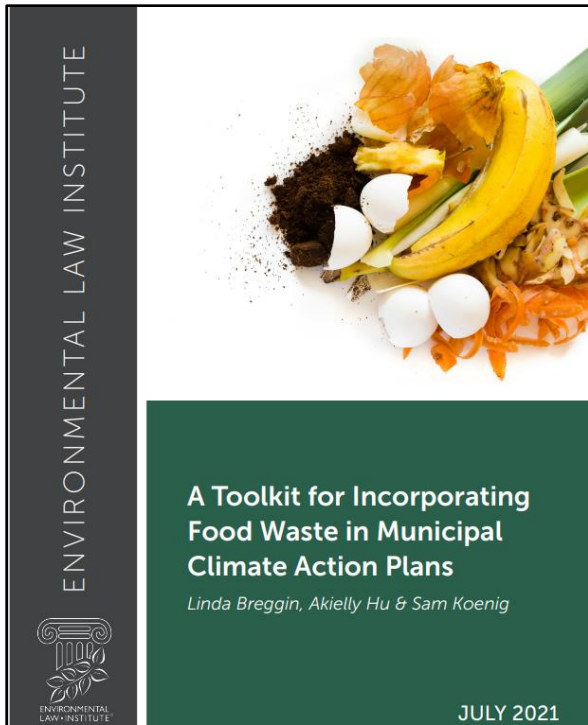
- *Example:* Adopt an organic waste ban or mandatory diversion policy (e.g., [Austin, TX](#)).

### Food Rescue

- *Example:* Implement an ordinance supporting a surplus food capture program (e.g., [Nashville, TN](#)).

### Food Waste Recycling

- *Example:* Adopt procurement policies favoring use of finished compost products in earth-disturbing activities (e.g., [Seattle, WA](#)).



# ELI/NRDC Model Laws, Ordinances, and Policies

**Purpose:** Intended to **reduce time and resources** associated with taking action to address food waste by providing model language based on **extensive best practices research**.

## Suite of Resources:

- Off-the Shelf Model Governance Tool;
- Off-the Shelf Model Governance Tool with Commentaries (facilitates tailoring the model language to interests/needs of individual municipalities);
- Background Memo; and
- Slide Deck.



MAY 2023  
FB 23 05 E

## MODEL EXECUTIVE ORDER ON MUNICIPAL LEADERSHIP ON FOOD WASTE REDUCTION With Commentaries\*

\* For a clean version without commentaries: [Model Executive Order on Municipal Leadership on Food Waste Reduction](#). For background information and supplemental resources: [Model Executive Order on Municipal Leadership on Food Waste Reduction Background Memorandum](#).

EXECUTIVE ORDER NO. \_\_\_\_  
SUBJECT: MUNICIPAL LEADERSHIP ON FOOD WASTE REDUCTION

### OUTLINE

- 1.0 Findings
- 2.0 Purpose
- 3.0 Definitions
- 4.0 Food Waste Reduction Target
- 5.0 Municipal Food Waste Reduction Measures
- 6.0 Municipal Department Strategies
- 7.0 Semi-autonomous and Quasi-Governmental Entity Strategies

I, [Mayor Name], [Mayor Title], by virtue of the power and authority vested in me, do hereby find, direct, and order as follows:

### 1.0 Findings<sup>1</sup>

- 1.1 WHEREAS, it is estimated that as much as 40 percent of the food supply in the United States goes uneaten and more than two-thirds of wasted food is sent to landfills and incinerators, where it typically represents the largest component of disposed waste; and
- 1.2 WHEREAS, food waste disposed of in landfills emits methane, a potent greenhouse gas that contributes to climate change; and

<sup>1</sup> Depending on applicable state and local governance structures and forms, as well as strategic considerations, a municipality may opt to use a vehicle other than an executive order, such as a policy or ordinance. Note too that the Model refers to "municipalities," which are typically defined to include cities and towns, but the Model can also be used by other types of local governments, such as counties.

<sup>2</sup> Section 1 statistics and benefits are drawn primarily from the following three sources: EPA, "National Overview: Facts and Figures About Materials, Waste and Recycling," last updated April 4, 2023, <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-about-materials-waste-and-recycling>; and Dana Gardner and Jonathan Bloom, *Wasted: How America Is Losing Up to 40 Percent of Its Food From Farm to Fork to Landfill*, NRDC, August 2012, <https://www.nrdc.org/resources/wasted-how-america-loses-40-percent-its-food-from-fork-landfill>.

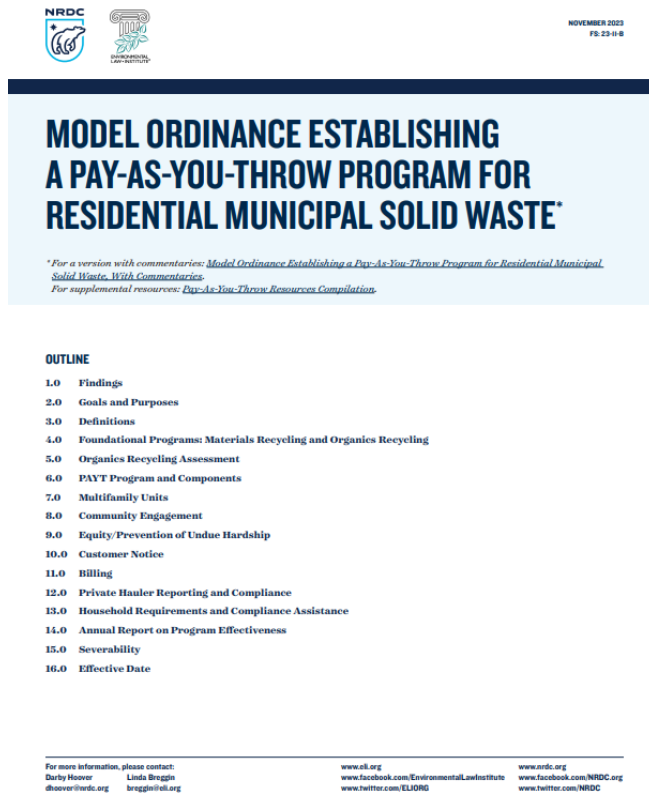
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# ELI/NRDC List of Model Governance Tools



- Model **Compost Procurement Policy** (2021);
- Model Ordinance on **Mandatory Reporting** for Large Food Waste Generators (2022);
- Model Executive Order on **Municipal Leadership** on Food Waste Reduction (2023);
- Model Ordinance Establishing a **Pay-As-You-Throw** Program for Residential Municipal Solid Waste (2023); and
- Model Municipal **Zoning Ordinance on Community Composting** Operations (forthcoming).

# Drivers of Local Government Action on Plant-based Proteins: Climate Mitigation

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- Food accounts for about **25 percent or more** of US households' consumption-based emissions.
- The average US resident's diet generates about **2.5 tons of carbon dioxide equivalent annually**.
- Plant-based proteins have a comparatively **small carbon footprint**—plants require less resources and energy to grow, harvest, and distribute.
- **Project Drawdown:** “plant-rich diets” have enormous climate mitigation potential and “can be adopted **incrementally** with **small behavioral changes** that together lead to globally significant reductions in greenhouse gas emissions.”

# Co-Benefits of Plant-Based Protein Actions

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*Beyond climate mitigation, municipal efforts to (1) increase the availability of plant-based proteins, and (2) engage the public on their benefits can contribute to a variety of co-benefits including:*



Expanded  
consumer choice



Environment



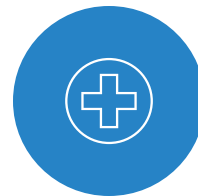
Resilience and  
food security



Equity and  
inclusion

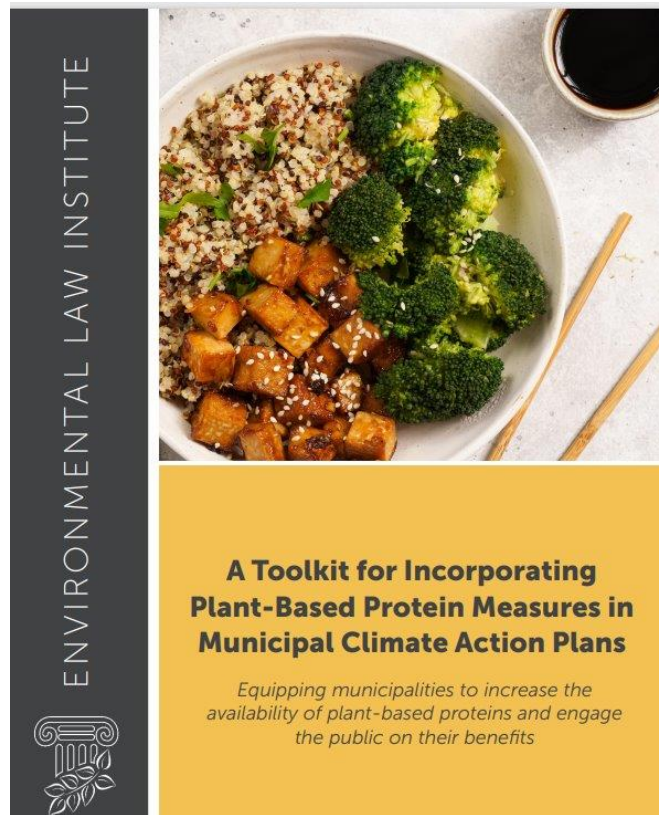


Animal welfare



Health

# ELI's Toolkit for Incorporating Plant-Based Protein Measures in Municipal Climate Action Plans



- Toolkit includes Menu of Actions featuring over **40 plant-based protein actions**.
- Based on review of municipal CAPs and sustainability plans from **36 geographically and size-diverse U.S. cities**.
- Includes **analysis** of key benefits, challenges, and legal and policy considerations.

# Menu Categories

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**1. Emissions Targets and Tracking:** Establishing food-related GHG emissions reduction targets and measuring progress (e.g., [Carrboro, NC](#)).



**2. Increased Availability:** Increasing the number of meals served or offered that contain plant-based proteins (e.g., [Philadelphia, PA](#)).



**3. Municipal Procurement:** Increasing the procurement of plant-based proteins by municipalities ([San Francisco, CA](#)).



**4. Public Awareness:** Educating and engaging the public on the climate benefits, as well as the many co-benefits, of plant-based proteins (e.g., [Blacksburg, VA](#)).

# Menu Categories

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**5. Leadership and Recognition:** Recognizing and rewarding businesses and organizations that demonstrate leadership in increasing the availability of plant-based proteins and engaging the public on their benefits (e.g., [San Antonio, TX](#)).



**6. Incentives, Funding, and Technical Assistance:** Supporting businesses and organizations seeking to expand plant-based protein offerings and to facilitate access to plant-based proteins, especially in communities that lack adequate access (e.g., [Iowa City, IA](#)).



**7. Cooperation and Pledges:** Endorsing international, national, and state initiatives that promote plant-based proteins (e.g., [New York City, NY](#)).



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