

# Greenhouse Gas Mitigation on Working Lands

## Greenhouse Gas Inventory of Northeast Agriculture

*Methane (CH<sub>4</sub>) accounts for 53% of Northeast agriculture emissions;*

*Nitrous oxide (N<sub>2</sub>O) accounts for 46% of Northeast agriculture emissions.*

This fact sheet summarizes greenhouse gas emissions from NE agriculture.

### Inventory of Agricultural Emissions by Process

Table 1 presents 2018 agricultural emissions inventory of each state in the Northeast Climate Hub (NECH) region using default values in the USEPA State Inventory Tool (SIT, Wightman, unpublished). Similar to the national GHG inventory, CH<sub>4</sub> and N<sub>2</sub>O account for 53% and 46% of farm emissions in the NECH region. Key pathways for N<sub>2</sub>O emission are from field applied sources of nitrogen and manure storage. Key pathways for CH<sub>4</sub> emission are from manure management and livestock enteric fermentation.

**TABLE 1: State Inventory Tool (SIT) estimates\* of GHG by type and agricultural system**

State	Ag. Soil N <sub>2</sub> O+	Manure N <sub>2</sub> O	Manure CH <sub>4</sub>	Livestock Enteric CH <sub>4</sub>	Total Ag CO <sub>2</sub> e	% N <sub>2</sub> O	% CH <sub>4</sub>	% CO <sub>2</sub>
	MT CO <sub>2</sub> e <sup>^</sup>							
Connecticut	0.10	0.02	0.07	0.12	0.32	37%	61%	2%
Delaware	0.50	0.15	0.05	0.04	0.74	88%	12%	0%
Maine	0.16	0.03	0.09	0.19	0.46	40%	59%	0%
Maryland	1.32	0.21	0.19	0.42	2.18	70%	28%	2%
Massachusetts	0.17	0.01	0.02	0.08	0.28	64%	35%	0%
New Hampshire	0.06	0.02	0.04	0.08	0.20	41%	59%	0%
New Jersey	0.38	0.01	0.02	0.07	0.49	80%	20%	1%
New York	2.93	0.57	2.32	3.68	9.54	37%	63%	1%
Pennsylvania	3.98	0.66	1.65	3.59	10.07	46%	52%	2%
Rhode Island	0.03	0.01	0.01	0.01	0.06	69%	31%	0%
Vermont	0.38	0.10	0.33	0.64	1.51	32%	65%	3%
West Virginia	0.59	0.07	0.05	0.72	1.47	45%	52%	3%
<b>TOTAL</b>	<b>10.58</b>	<b>1.87</b>	<b>4.83</b>	<b>9.65</b>	<b>27.33</b>	<b>46%</b>	<b>53%</b>	<b>1%</b>

\* Estimates use all default values for the respective state inventories (Wightman, unpublished).

<sup>^</sup> CO<sub>2</sub>e = Carbon Dioxide Equivalents; the IPCC method converts the potency of different greenhouse gases into a common unit, a CO<sub>2</sub> equivalent. This CO<sub>2</sub>e conversion is based on the IPCC AR4 100-year Global Warming Potential value where N<sub>2</sub>O=298, CH<sub>4</sub>=25, and CO<sub>2</sub>=1.

+ Current estimates using the revised 2018 IPCC methodologies (Wightman & Woodbury, unpublished results for NY) have lower GHG emissions of N<sub>2</sub>O from Ag. Soils than currently estimated in the US EPA SIT.

Enteric fermentation (burping) from livestock, manure management, and nitrogen use account for most of GHG emissions from agriculture. To note, energy use on farm is counted by the "energy sector", not the "agricultural sector". In dairy heavy states like Vermont, 65% of VT agricultural emissions come from livestock. In dairy light states like Delaware, 88% of DE agricultural emissions come from nitrogen use on fields.

*10 Northeast USA Governors have committed to reducing "net GHG emissions by at least 50-52% below 2005 levels by 2030."*

## Northeast Farmland Area, Milk Production & Governors

The NECH region represents 24% of US states, contributes 14% of the nation's milk, and manages ~25 million acres (3% of US farmland, Table 2).

**Table 2: Northeast States Milk Production, Farmland Acres, and Climate Alliance Commitment**

States in the NECH	Dairy Rank	Milk production (pound milk)^	Farmland Rank	Acres in Farms	Governors in the Climate Alliance
Connecticut	34	428,000,000	49	380,000	Ned Lamont
Delaware	45	73,700,000	46	530,000	John Carney
Maine	32	621,000,000	41	1,300,000	Janet Mills
Maryland	29	840,000,000	40	2,000,000	Larry Hogan
Massachusetts	39	192,000,000	47	500,000	Charlie Baker
New Hampshire	37	238,000,000	48	430,000	
New Jersey	43	100,000,000	45	750,000	Phil Murphy
New York	4	15,122,000,000	36	6,900,000	Kathy Hochul
Pennsylvania	7	10,108,000,000	35	7,300,000	Tom Wolf
Rhode Island	48	10,600,000	50	60,000	Dan McKee
Vermont	19	2,697,000,000	42	1,200,000	Phil Scott
West Virginia	44	90,000,000	39	3,500,000	
<b>Total NECH</b>		30,520,300,000		24,850,000	
<b>Total US</b>		212,382,000,000		896,600,000	
<b>NECH (% of US)</b>		<b>14%</b>		<b>3%</b>	

^Data from the USDA National Agricultural Statistical Service, accessed July 2021.

## State & Stakeholder Goals to Address GHG

Collectively society has made bold ambitions to slow the rate of climate change for future generations. This includes United Nations "Paris Agreement" with 197 signatories agreeing to limit global warming to well below 2 degrees Celsius. US Secretary of Agriculture Vilsack called for "building climate resilience, mitigating emissions and conserving natural resources" (USDA 2021). The International Fertilizer Association and Innovation Center for US Dairy have agreed to a "Net Zero Initiative" to achieve a carbon-neutral dairy by 2050 (ICUSD. 2021). Ten NE governors are members of the U.S. Climate Alliance (Table 2) committing to "reduce net GHG emissions by at least 50-52% below 2005 levels by 2030". Thus, the Northeast is primed to make a difference in reducing US agricultural GHG emissions.

**To Learn More**, please visit: <http://blogs.cornell.edu/workinglands>

### GHG & Working Lands

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