

University of
Massachusetts
Amherst

Food Production and Farmland Protection

Western Massachusetts Solar Forum
Clem Clay, UMass Extension Agriculture Program Director
September 12, 2023

A bit about me

- Oversee professional Extension Educators serving production agriculture and commercial horticulture
- Serve on Agricultural Lands Preservation Committee (approving APR farmland protection projects)
- Served as subject matter expert in MA Farmland Action Plan (not yet released)
- Co-Investigator of DOE-funded research program led by Clean Energy Extension (CEE) looking at dual-use solar and its effects on crop production
- Assist with CEE review of predetermination applications for dual-use solar “adder”

Topics

1. Local, state, and regional goals for food production and farmland protection.
2. Effects of solar PV deployment on agriculture, farmland, and farm economics

What we'll cover

1. Local, state, and regional goals for food production and farmland protection.
 - Massachusetts statewide goals for farmland protection
 - New England goals for food production (and farmland required to meet these goals)
2. Effects of solar PV deployment on agriculture, farmland, and farm economics
 - Preliminary observations from DOE-funded research project and review of predetermination applications. Too soon to say anything conclusive!

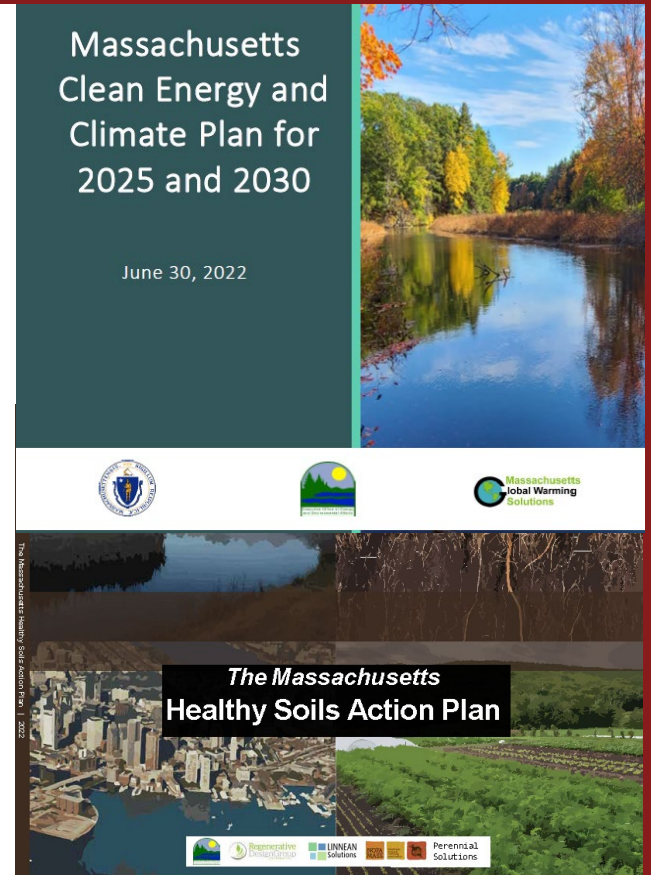
Massachusetts statewide goals for farmland protection

Recent state-led planning efforts:

- Clean Energy and Climate Plan for 2025 and 2030 (2022)
- Healthy Soils Action Plan (2023)
- Farmland Action Plan (late 2023?)

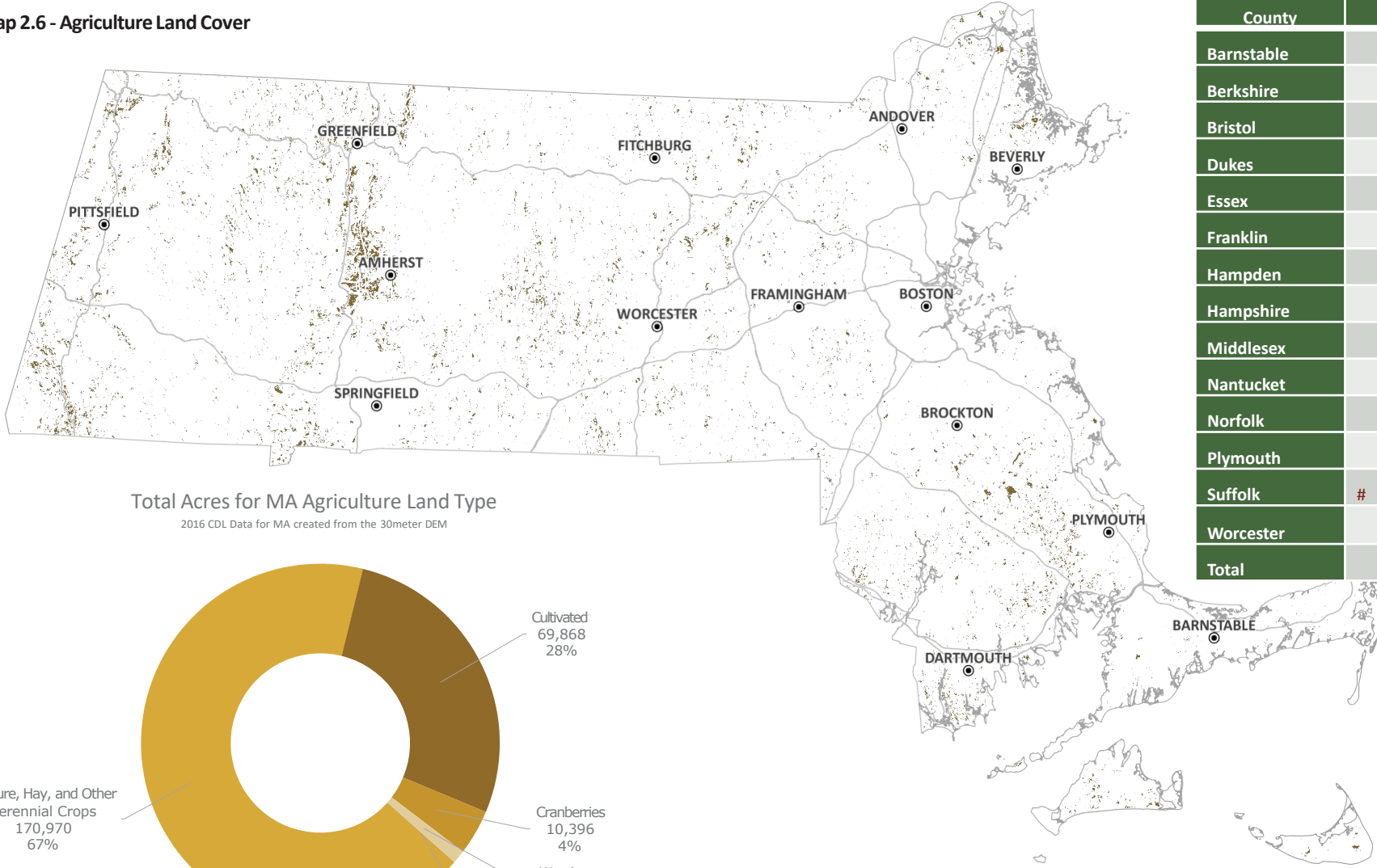
Key Farmland Goals:

- By the end of 2024, EEA will develop and seek to advance new legislation to support the goal of **No Net Loss of Forest and Farmland**. (Clean Energy and Climate Plan, p. 95)
- **Protect 30%** of undeveloped prime soils and soils of statewide importance by 2030 (Healthy Soils Action Plan, p. 77)



Farmland Type, Location, Protection Status

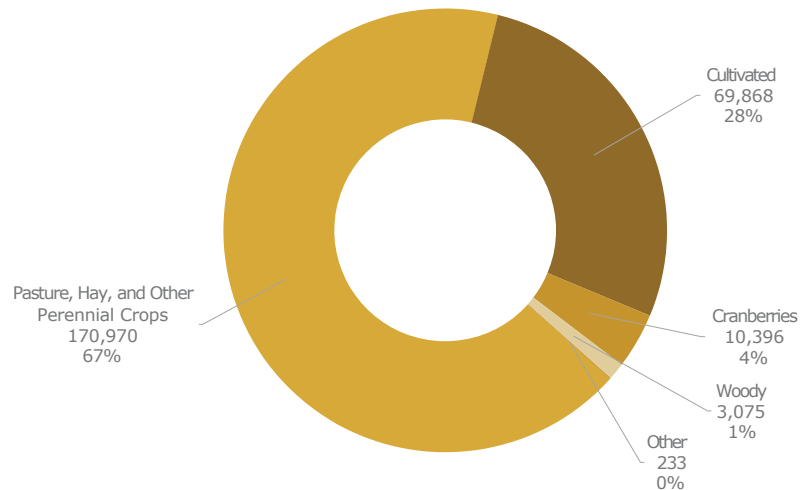
Map 2.6 - Agriculture Land Cover



County	Protected**	Unprotected	Total	
Barnstable	203	6%	3,465	3,668
Berkshire	7,701	11%	62,836	70,537
Bristol	2,918	8%	32,625	35,543
Dukes	254	4%	6,371	6,625
Essex	2,209	11%	17,610	19,820
Franklin	10,801	13%	69,239	80,040
Hampden	2,717	7%	36,483	39,201
Hampshire	9,605	17%	46,986	56,591
Middlesex	1,691	6%	25,396	27,087
Nantucket	13	0%	2,572	2,584
Norfolk	192	5%	3,818	4,009
Plymouth	940	2%	47,915	48,856
Suffolk	#		#	#
Worcester	8,262	8%	97,153	105,416
Total	47,507	10%	452,471	499,977

Total Acres for MA Agriculture Land Type

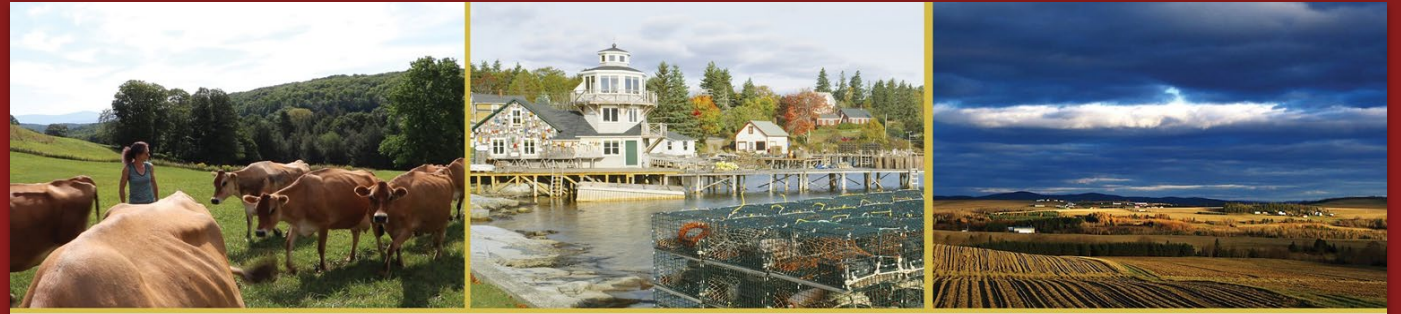
2016 CDL Data for MA created from the 30meter DEM



Map: MA Healthy Soils Action Plan
 Chart: American Farmland Trust Analysis of farmland data expected to appear in MA Farmland Action Plan.

New England goals for food production (and farmland required)

- New England Feeding New England report is *not* produced by a public agency.
www.nefoodssystemplanners.org
- MDAR and other New England Departments of Agriculture believe that it is a valuable tool and that there is significant alignment between departmental goals and the report's aims.
- Only effort in our region to set a food production goal and conduct rigorous analysis of the land required to produce the desired food output.
- Goal statement: "By 2030, 30% of the food consumed in New England is produced/harvested/caught within New England."



VOLUME 2

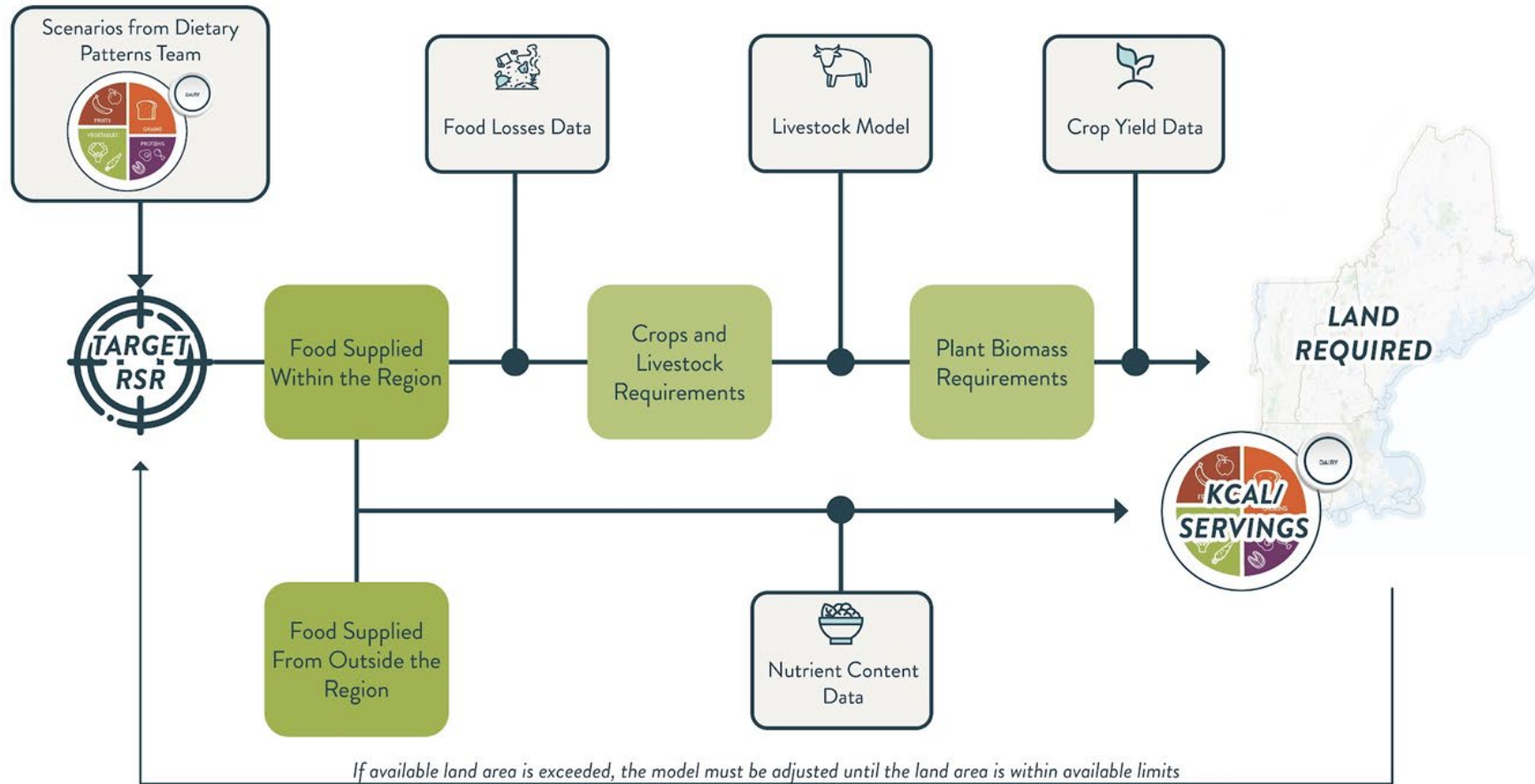
ESTIMATING PRODUCTION FOR 30% REGIONAL SELF-RELIANCE

MAY 2023



NEFN Land Requirements Calculation Model

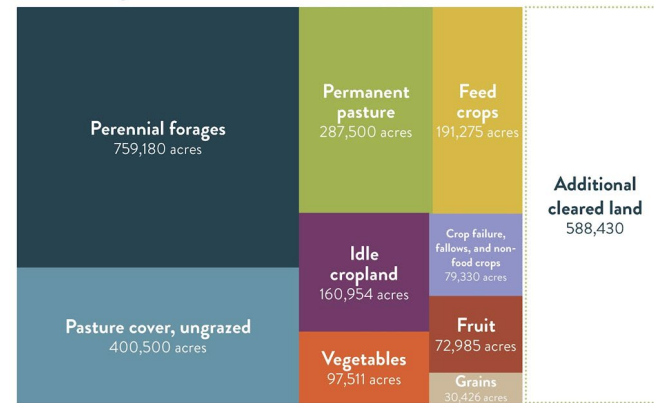
FIGURE 5: Flow Diagram of the Production Milestones Model



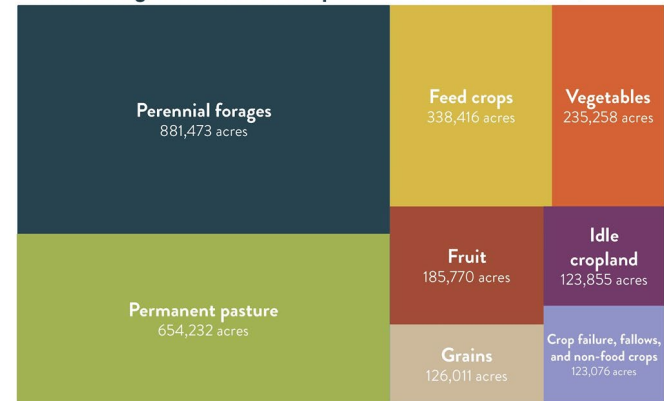
NEFN 30% Land Requirement

To achieve 30% regional production available for consumption (in servings), **400,000** in existing underutilized cropland and **590,000** in new cropland would need to be brought into production.

Land in Agriculture (2017): 2,079,661 acres



Estimated Agricultural Land Required for 30% RSR: 2,668,092 acres



Acreage Increase Estimate

TABLE 1: Comparing New England Agriculture to US and Major Agricultural Regions, 2017

	Farms	% of US Farms	Average Size of Farms (acres)	% of Average US Farm Size	Land in Agriculture (acres)	% of US Land in Agriculture	Agricultural Sales	% of US Agricultural Sales	Average Sales	% of US Average Sales
US	2,042,220	100.00%	441	100.00%	900,217,576	100.00%	\$410,241,113,651	100.00%	\$190,245	100.00%
Midwest	731,018	35.80%	579	131.2%	337,218,515	37.46%	\$183,416,643,723	44.71%	\$253,758	133.38%
Central Valley	35,198	1.72%	399	90.6%	12,932,201	1.44%	\$30,630,751,982	7.47%	\$721,323	379.15%
New England	32,336	1.58%	107	24.26%	3,856,499	0.43%	\$2,902,690,218	0.71%	\$79,054	41.55%
Connecticut	5,521	0.27%	69	15.65%	381,539	0.04%	\$612,542,373	0.15%	\$105,074	55.23%
Maine	7,600	0.37%	172	39.00%	1,307,613	0.15%	\$704,245,176	0.17%	\$87,758	46.13%
Massachusetts	7,241	0.35%	68	15.42%	491,653	0.05%	\$501,746,786	0.12%	\$65,624	34.49%
New Hampshire	4,123	0.20%	103	23.36%	425,393	0.05%	\$198,291,685	0.05%	\$45,548	23.94%
Rhode Island	1,043	0.05%	55	12.47%	56,864	0.01%	\$61,240,088	0.01%	\$55,607	29.23%
Vermont	6,808	0.33%	175	39.68%	1,193,437	0.13%	\$824,624,111	0.20%	\$114,713	60.30%

Source: USDA 2017 Census of Agriculture, https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1_Chapter_1_State_Level/. The Midwest is made up of 12 states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The Central Valley of California includes 19 counties: Butte, Colusa, Glenn, Fresno, Kern, Kings, Madera, Merced, Placer, San Joaquin, Sacramento, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Yolo, and Yuba.

590,000 new cropland acres = 15% increase across New England, or 75,000 new acres in Massachusetts, if all states increase proportionately.

Effects of solar PV deployment on agriculture, farmland, and farm economics

- Farms vary a lot in soils, crops, ownership/tenure/management structures.
- Crops vary in their adaptability to solar installations designed for dual-use. Some crops may succeed, but farmers will typically lose flexibility when panels are installed.
- The tradeoff between agricultural production and energy production will also vary a lot with farm factors and solar factors, making policy and incentive design difficult.
- The benefits of solar revenue may or may not flow to those responsible for the agricultural production on the farm. “Farmer” can mean many different things, and those debating the topic may need to clarify who they are referring to.

Thanks!

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