

environmental infrastructure primer

agriculture



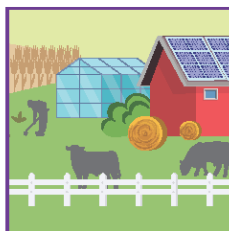
**Environmental
Markets**



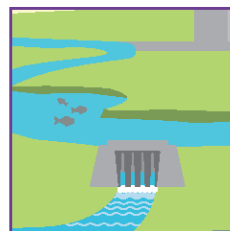
**Land
Conservation**



**Parks and
Recreation**



Agriculture



Water
(Coming soon in 2023)



**Waste and
Recycling**
(Coming in 2024)



Agriculture

Primer

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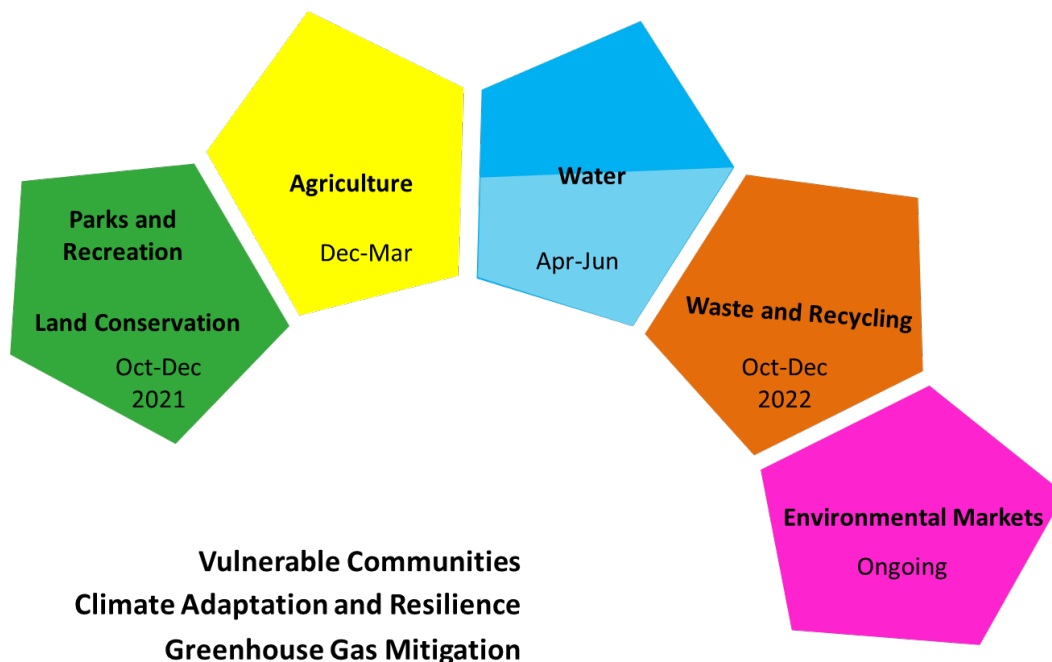
AGRICULTURE

PRIMER

1. Introduction

In October of 2021, the Connecticut Green Bank (“Green Bank”) developed a plan upon which it was going to engage stakeholders to understand the various components of “environmental infrastructure” – see Figure 1. With its mission to “confront climate change by increasing and accelerating investment into Connecticut’s green economy to create more resilient, healthier, and equitable communities,” within each component of “environmental infrastructure,” the cross-cutting issues of reducing greenhouse gas emissions (“GHG”), increasing climate adaptation and resilience, and enabling investment in vulnerable communities was explored.

Figure 1. Process to Understand Components of Environmental Infrastructure



This primer reflects the observations, findings, and initial recommendations from the conversations with stakeholders and research conducted on agriculture.

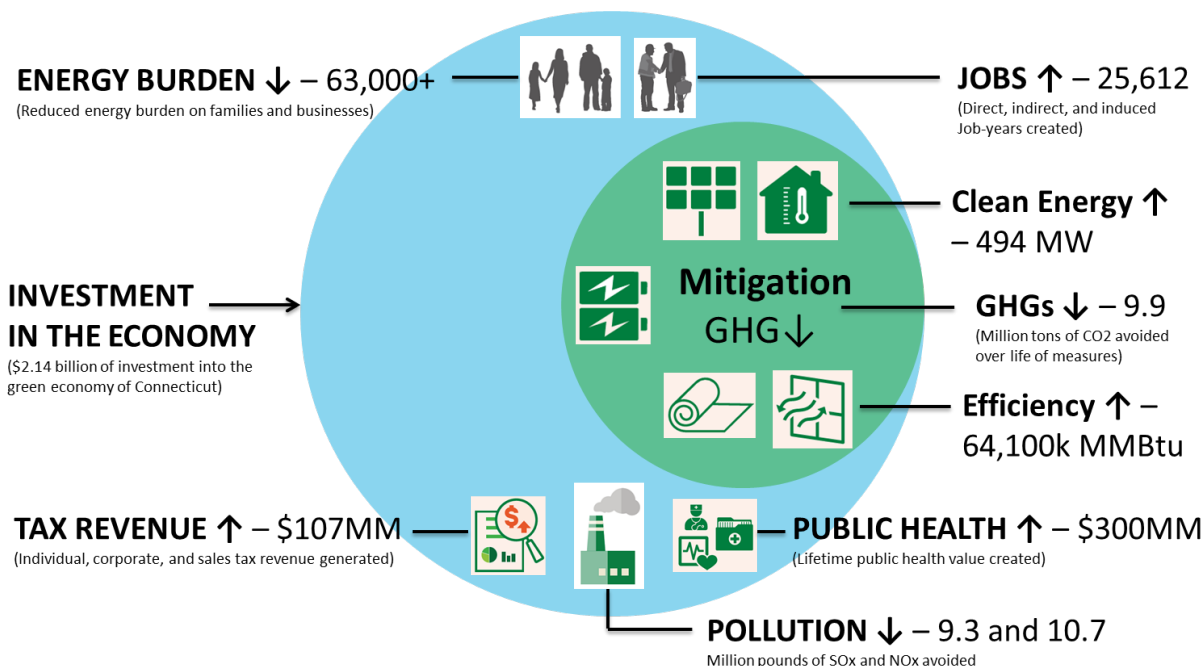
2. Overview

On July 6, 2021, Governor Ned Lamont signed Public Act 21-115 “An Act Concerning Climate Change Adaptation” (“the Act”) into law. The bipartisan-supported public policy was among the sixty-one (61) recommendations made by the Governor’s Council on Climate Change (“GC3”), including a recommendation to expand the scope of the Green Bank beyond “clean energy” to include “environmental infrastructure” (i.e., Recommendation #57).

Since its founding over a decade ago, the Green Bank has focused its efforts on using a limited amount of public resources to mobilize multiples of private investment in Connecticut to increase

and accelerate the deployment of “clean energy” to deliver social and environmental impact – see Figure 2.

Figure 2. Decennial Impact of the Green Bank with focus on “Clean Energy” Deployment and Mitigation of GHG Emissions



Given its mission, the Green Bank helps the State of Connecticut achieve its ambitious public policy objectives (e.g., GHG emission reductions targets, renewable portfolio standards). In so doing, by 2025, no less than 40 percent of investment and benefits from its programs are to be directed to vulnerable communities.¹

The Act, expands the scope of the Green Bank beyond “clean energy” to include “environmental infrastructure,” and includes the following key provisions:

- **Definition** – “environmental infrastructure” means structures, facilities, systems, services and improvement projects related to (A) water, (B) waste and recycling, (C) climate adaptation and resiliency, (D) agriculture, (E) land conservation, (F) parks and recreation, and (G) environmental markets, including, but not limited to, carbon offsets and ecosystem services;
- **Comprehensive Plan** – requirement for the Green Bank to develop a Comprehensive Plan² prior to implementing any programs or initiatives related to “environmental infrastructure”;

¹ “Vulnerable communities” means populations that may be disproportionately impacted by the effects of climate change, including, but not limited to, low and moderate income communities, environmental justice communities pursuant to section 22a-20a, communities eligible for community reinvestment pursuant to section 36a-30 and the Community Reinvestment Act of 1977, 12 USC 2901 et seq., as amended from time to time, populations with increased risk and limited means to adapt to the effects of climate change, or as further defined by DEEP in consultation with community representatives.

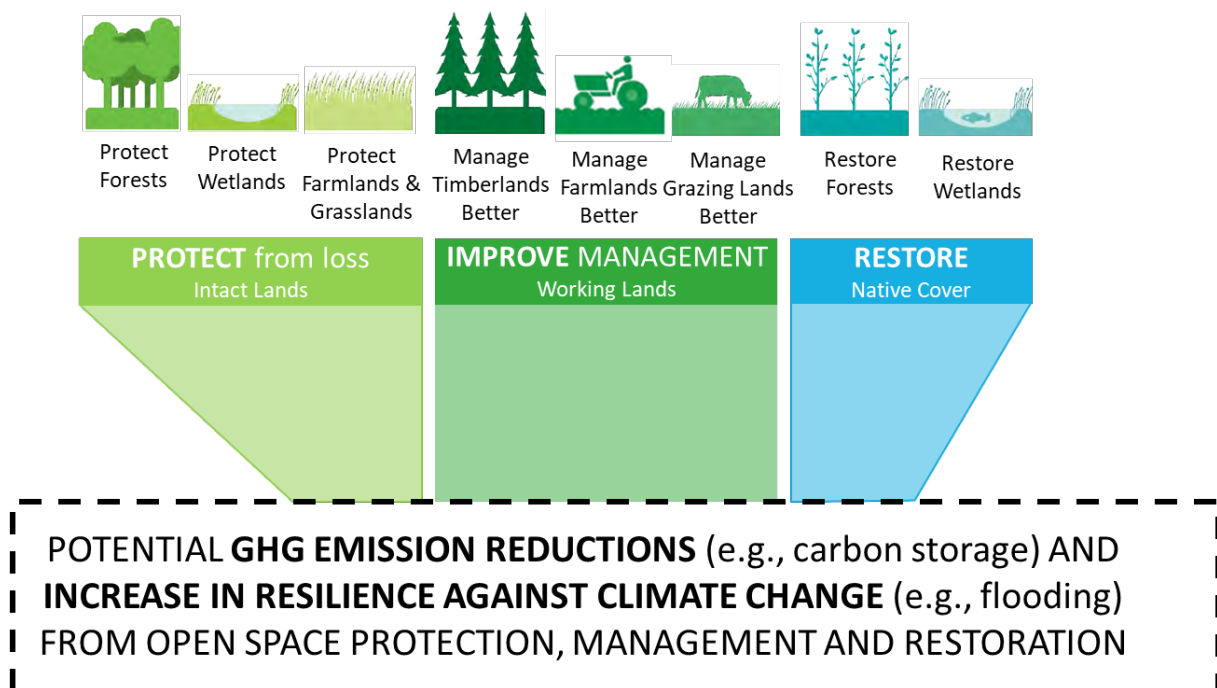
² https://www.ctgreenbank.com/wp-content/uploads/2022/07/Comprehensive-Plan_FY-2020-and-Beyond_Revisions-for-FY22_012522.pdf

- **Reporting** – inclusion of the Banks Committee and the Environment Committee, alongside the Energy and Technology Committee and Commerce Committee in terms of reporting; and
- **Bonding** – the ability to issue 25-year bonds for “clean energy” and 50-year bonds for “environmental infrastructure” (i.e., no more than the useful life of the projects), supported by the Special Capital Reserve Fund (“SCRF”), for up to 25 years to improve the rating of the bonds issued.

This document attempts to summarize the findings from the research and outreach efforts conducted by the Green Bank³ on “agriculture” from December 2021 through March of 2022 and includes the following sections: (A) overview, (B) key public policies, (C) market potential, (D) target, (E) funding and financing programs, (F) other programs, (G) stakeholder outreach, (H) findings, (I) opportunities, (J) history of leadership and innovation, (K) references, and (L) definitions.

Nature-based solutions (e.g., agriculture) such as protecting farmlands from loss and improving farming practices, can support the Green Bank’s mission by both mitigating the GHG emissions that cause climate change (e.g., climate smart agriculture) and increasing resilience against the impacts of climate change (e.g., flood protection) – see Figure 3.

Figure 3. Nature Based Solutions to Confront Climate Change - Mitigation and Resilience



3. Key Public Policies

³ Led by Bryan Garcia (President and CEO) and Ashley Stewart (Consultant)

The following are key public policies that advance “agriculture” in Connecticut, including, but not limited to:

1. **State Plan of Conservation and Development** (CGS 16a-24) – is an overarching statement of state policy in matters pertaining to land and water resource conservation and development. The Office of Policy and Management (“OPM”) prepares revisions to the State Conservation and Development Plan (“State C&D Plan”) on a recurring 5-year cycle and submits it for adoption by the Connecticut General Assembly (“CGA”). Once adopted, the State C&D Plan is then implemented by state agencies whenever they undertake certain actions.⁴ The current State C&D Plan (i.e., for 2018-2023), includes the relevant “clean energy” and “environmental infrastructure” items, including, but not limited to:
 - A. **Greenhouse Gas Mitigation** – reducing carbon dioxide emissions in the state consistent with the recommendations of the Connecticut Climate Change Preparedness Plan (i.e., 5.10);
 - B. **Climate Adaptation and Resilience** – utilizing the state’s renewable power generation potential to the extent compatible with the state goals for environmental protection, and minimize potential impacts to rural and suburban character and agricultural and scenic resources when siting new power generation facilities and/or transmission infrastructure (i.e., 4.8); and
 - C. **Agriculture** – supporting community-based agriculture, historic preservation, and access to urban green spaces and waterways (i.e., 1.11), encouraging and promoting access to parks and recreational opportunities, including trails, greenways, community gardens, and mixed-income housing (i.e., 2.8), promoting agricultural businesses and supportive industries that are vital to the regional economy, preserve prime farmland through the acquisition of development rights, and when avoidance of such lands is not practical, minimize the loss of or conversion of agricultural lands by state-sponsored development actions (i.e., 4.10), promoting Connecticut’s commercial and recreational fishing and aquaculture industries (i.e., 4.11), preserving and maintaining traditional working lands for the production of food, fiber, horticultural plant production, and supporting niche agricultural operations that enhance community food security throughout Connecticut (i.e., 5.8).
2. **Executive Order 21-3** – On December 16, 2021, Governor Ned Lamont signed Executive Order 21-3 which calls for 23 actions supporting more than thirty recommendations from the Governor’s Council on Climate Change, including several recommendations on working lands:⁵
 - A. **Forest Climate Resilience and Mitigation Potential** – DEEP engagement of stakeholders to ensure Connecticut’s forests continue to be resilient against the

⁴ Quasi-publics are not subject to this requirement

⁵ It should be noted that Connecticut is a member of the United States Climate Alliance, and one of the original signatories to the Natural and Working Lands Challenge in 2018 – <http://www.usclimatealliance.org/nwlchallenge>

impacts of climate change and to maximize forest potential to sequester and store carbon in support of Connecticut's GHG emission reduction goals.

- B. Agriculture Climate Resilience and Mitigation Potential** – DoAg engagement of stakeholders to ensure Connecticut's working lands and soils continue to be resilient against the impacts of climate change and to maximize forest potential to sequester and store carbon in support of Connecticut's GHG emission reduction goals.
 - C. Climate Resilience Using Nature-Based Solutions on State Properties** – DEEP and Department of Administrative Services ("DAS") to develop guidance for state agencies to use nature-based solutions for flood and erosion control and stormwater management, integrate coastal marsh migration in state projects in coastal areas, and utilize low impact development and green infrastructure in new state construction and state-funded construction or redevelopment.
- 3. **Use Value Assessment Law** (Public Act 490 or CGS 12-107a-f)⁶ – passed by the CGA in 1963, it allows a farm, forest, or open space land to be assessed at its use value rather than its fair market or highest and best use value (as determined by the property's most recent "fair market value" revaluation) for purposes of local property taxation. Without the lower use value assessment, most landowners would have to sell the land because they would not be able to afford the property taxes on farm, forest, or open space land. It must be noted that Public Act 490 allows farmers to continue to farm, and other landowners to continue to own forest and open space land without being forced to sell it to pay the local property taxes. When the legislature passed Public Act 490 in 1963, it included in the law's wording that "it was in the public interest to encourage the preservation of farm, forest, and open space land." Studies done across the nation have conclusively proven that property tax revenues generated by farm, forest, or open space land, are far greater than the expenditures by the town to service that land. For example, under the current structure, the residential sector costs a town more to service than the amount of property tax generated from that sector. Thus, farm, forest, and open space land can actually help control and maintain reasonable rates of property taxation for all of a town's taxpayers.
 - 4. **Ten Mill Program** (CGS 12-96) – Ten Mill Program was developed in 1913 and required forest landowners to make a 100-year commitment to maintaining land as forest land in exchange for municipalities holding the property at a 10-mill rate and the valuation of the land at evaluation for 50 years after. The Ten Mill program has not added new properties since the 1970's, however, both programs provide support to landowners that encourages conservation and open space.
 - 5. **Property Tax Exemptions** (CGS 12-81) – including farming tools (38), farm products, including produce and animals (39-42), and temporary structures (73). In addition to PA 490, a municipality may also vote to abate up to 50 percent of the property taxes of various farms (e.g., dairy, fruit, nursery) if the farm employs nontraditional cultivation methods (i.e., CGS 12-81m). And farm machinery (except motor vehicles) and building (per

⁶ https://www.cga.ct.gov/current/pub/chap_203.htm#sec_12-107a

building) up to \$100,000 in value is already exempt from local property taxes, and a municipality may vote to provide an additional \$100,000 exemption for machinery and/or buildings (e.g., housing for seasonal employees).

6. **Open Space Target** (CGS 23-8)⁷ – establishes a 21% (i.e., 673,210 acres) of state land area by 2023 held by open space land, with 10% from the state (e.g., forests, parks) and not less than 11% from partners (e.g., municipalities, water companies, or non-profit land conservation organizations). The Comprehensive Open Space Acquisition Strategy (or “Green Plan”)⁸ is the comprehensive strategy for achieving the state goal, which includes priorities for strategic acquisitions of open space for climate change resiliency and preserving open space in perpetuity for state lands with high conservation value.
7. **Community Investment Act** (Public Act 05-228)⁹ – “An Act Concerning Farm Land Preservation, Land Protection, Affordable Housing and Historic Preservation,” also known as the Community Investment Act (“CIA”), CIA provides a dedicated and consistent source of funding for state preservation of open space (Department of Energy and Environmental Protection or “DEEP”), farmland (Department of Agriculture or “DoAg”), historic sites (Department of Economic and Community Development or “DECD”), and affordable housing (Connecticut Housing Finance Authority or “CHFA”). Through a \$40 surcharge on local land recordings (i.e., \$1 to Town Clerk, \$3 to local government, \$10 supplemental income to dairy farmers, and \$26 to State Treasurer), about \$22 MM is raised each year, which is equally distributed in four (4) parts to the priority funding areas. DoAg is required to distribute CIA funds as follows: \$100,000 for the “Connecticut Grown” program, \$75,000 for Connecticut Farm Link Program, and \$1 million for the Agriculture Viability Grants Program. CIA also funds DoAg’s Farmland Preservation Programs and supports the Connecticut Food Policy Council, Connecticut Seafood Advisory Council, and Connecticut Farm Wine Development Council.
8. **Forest Management Act** (CGS 23-20(b))¹⁰ – makes several changes in the Public Act 490 tax relief program for owners of eligible forest land and authorizes the Commissioner of DEEP to apply for certification or licensure of publicly owned woodlands and products from those woodlands under at least one of nine specified sustainable forest programs.¹¹ The 490 program provides farm, forest, and open-space landowners with tax relief to reduce the financial pressure to convert their property to other uses. Forest landowners whose property meets certain criteria may apply to the state forester for the relief.
9. **Climate Smart Agricultural Practices** – as part of the passage of the budget by the Connecticut General Assembly within the 2022 legislative session, “An Act Concerning Climate Smart Agricultural Practices” was passed. Beyond providing \$14 MM in funding resources to support farmers through the policy, the DoAg may pay or reimburse nonprofit organizations, soil and water conservation districts, UCONN Extension Services,

⁷ <https://law.justia.com/codes/connecticut/2012/title-23/chapter-447/section-23-8/>

⁸ <https://portal.ct.gov/DEEP/Open-Space/The-Green-Plan>

⁹ <https://www.cga.ct.gov/2005/ACT/Pa/pdf/2005PA-00228-R00SB-00410-PA.pdf>

¹⁰ Kingdon Woodland Assurance Scheme, or Smart Wood Program

¹¹ Sustainable Forestry Initiative Program, American Tree Farm System, Canadian Standards Association’s Sustainable Management System Standards, Finnish Standard, Forest Stewardship Council, Pan-European Forest Certification Program, Swedish Standards, United Kingdom Woodland Assurance Scheme, or Smart Wood Program

or municipalities for providing technical assistance, distributing grant funds to producers, and other activities that will increase the number of farmers who are implementing climate-smart agriculture and forestry practices.

In order to identify opportunities to mobilize private investment, it is important to understand the public policy context in which “agriculture” operates. With the focus on the Green Bank’s mission (i.e., confront climate change), public policy provides a mechanism to catalyze private investment.

4. Market Potential

Land Cover

The following is a breakdown of the markets potential for “agriculture” (i.e., farmland), including other natural forms of land cover (i.e., forestland and wetlands) – see Table 1.

Table 1. Land Cover in Connecticut (2015)¹²

3,179,253 Acres				
Land and Water in Connecticut				
921,827 Acres Developed Land ¹³ 29%	233,847 Acres Farmland 7%	1,873,471 Forestland ¹⁴ 59%	129,153 Wetlands ¹⁵ 4%	20,955 Other Lands ¹⁶ 1%

More than 70% of Connecticut’s land is farmland, forestland, or wetland – see Figure 4.

It should be noted that CGS 23-20(b) allows DEEP to apply for sustainable forest management status for its 175,000 acres of state forests at 33 locations. State forests achieving such certification status may create opportunities to sell sustainably harvested timber or other wood products from state-owned forestlands.

¹² UCONN CLEAR Project – 2015 Land Cover

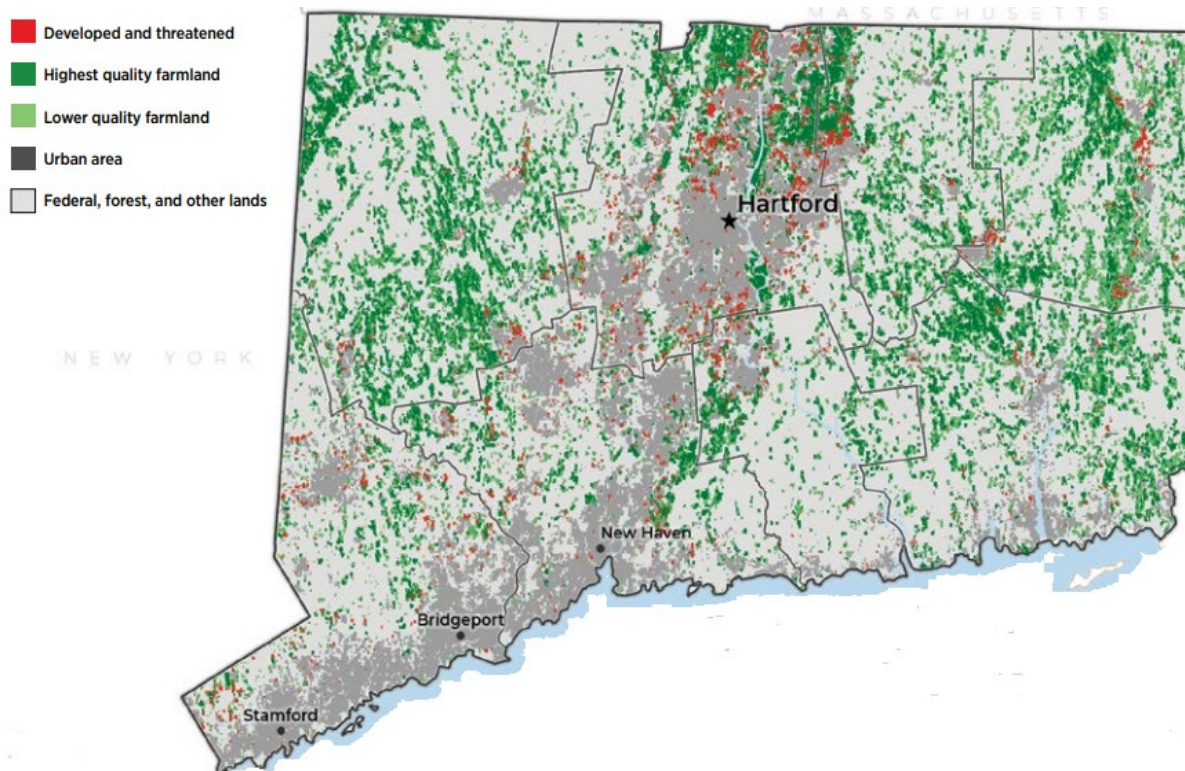
¹³ Includes “Developed,” “Turf & Grass,” and “Other Grasses” classifications

¹⁴ Includes “Deciduous Forest,” “Coniferous Forest,” “Forested Wetland,” and “Utility-Rights-of-Way (Forest)” classifications

¹⁵ Includes “Water,” “Non-Forested Wetlands,” and “Tidal Wetlands” classifications

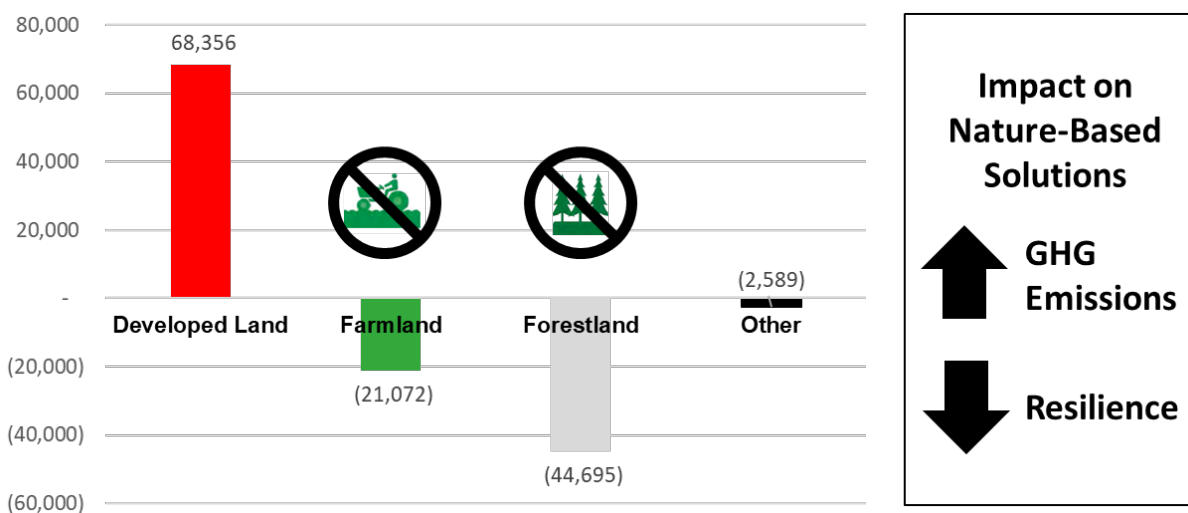
¹⁶ Includes “Barren” classification

Figure 4. Statewide Land Cover Map of Connecticut



Over the past twenty years, farmland and forestland have been lost to development – see Figure 5.

Figure 5. Statewide Land Cover Change (Acres) from 1995-2015



From 2001 through 2016, approximately 6% of the state's farmland was converted to urban or low-density residential development – placing the state in the top three nationally in percent of

farmland lost to development.¹⁷ This loss of farmland and forestland, results in an increase in GHG emissions and a reduction in resilience as a result of development. Therefore a “no net loss of farmlands and forestlands” policy is important when it comes to confronting climate change in Connecticut.¹⁸

Use Value and Local Property Taxes

Recognizing the many public benefits nature provides the residents and businesses of the state, it is a policy in Connecticut that owners of farms, forests, and open space NOT experience burden through excessive property tax assessments that do not represent or align with the owner’s current land-use. Public Act 490, known as the current-use law, allows farms, woodlots, or open space to be assessed at its use value, rather than its fair market or highest and best use value for purposes of local property taxation – see Table 2.

Table 2. 2020 Recommended Land Use Values per Acre per Public Act 490 (Effective October 1, 2020)

Category	State-Wide	River Valley
Tillable A	\$1,880	\$2,530
Tillable B	\$1,280	\$1,810
Tillable C	\$1,110	\$1,690
Tillable D	\$850	\$1,170
Orchard E	\$990	\$990
Pasture F	\$280	\$280
Swamp, Ledge, Scrub G	\$40	\$40
Woodland, Forestland	\$390	\$390

Assessed property tax is calculated at the town mill rate times the number of acres times the value of the land – in case of Public Act 490 land, the value is use value per the table above.

The following is a breakdown of natural lands (i.e., farmland, forestland, and wetlands, including open space land) in Connecticut served by the use value for property taxes under Public Act 490 – see Table 3.

Table 3. Natural Lands in Connecticut Served by Public Act 490

2,236,471 Acres Natural Lands 70%		921,827 Acres Developed Land (including Other) 30%
856,385¹⁹ Acres Natural Lands Served by Public Act 490 38%	1,380,086 Acres	

¹⁷ “Planning for Agriculture – A Guide for Connecticut Municipalities: Emerging Agricultural Trends” by the American Farmland Trust and Connecticut Department of Agriculture (2020 Edition) (Page 19)

¹⁸ It should be noted that Connecticut is a signatory to the Natural and Working Lands Challenge of the United States Climate Alliance where there is an action to support an Alliance-wide goal to maintain natural and working lands as a net sink of carbon and protect and increase carbon storage capacity, while balancing near and long-term sequestration objectives.

¹⁹ As of September 15, 2021 with 83% of towns reporting – <https://portal.ct.gov/DEEP/Forestry/Forest-Land-Taxation/Classification-of-Land-as-Forest-Land>

233,895 Acres Farmland 27%	465,774 Acres Forestland 54%	149,942 Acres Open Space Land 18%	6,774 Acres Other Land 1%	Natural Lands <u>not</u> Served by Public Act 490 62%	
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Farmers pay an estimated \$34.5 MM per year in property taxes.²⁰

Economic Development and Other Factors

The agriculture industry in Connecticut is worth \$5.2 billion,²¹ supports 29,163 jobs, 5,521 farms totaling approximately 381,539 acres, including from cropland (i.e., 148,609 acres), pastureland (i.e., 31,923 acres), and woodlands (i.e., 201,007 acres) and 69% of farms are less than 50 acres, including:

- **Ownership** – 72% are owned and operated vs. leased from others, 6.5% of farms and 10% of farmland is operated by tenant farmers who own none of the land they farm; and
- **Demographics** – 31% of producers are 65 or older, over 40% of producers are woman, and less than 2% of producers are BIPOC (compared to 37% BIPOC population in Connecticut).²²
- **Example Products** – from land and sea farms, including, but not limited to:
 - **Dairy Farms** – there are 90 licensed dairy farms that produce 428 million pounds of milk in 2019 (i.e., enough to satisfy about 86% of the milk consumed by Connecticut residents), and nearly \$80 million in dairy products in 2020;
 - **Poultry Farms** – there are 1265 egg-laying and 159 meat producing chicken farms, with \$260 million in poultry and poultry product sales in 2020; and
 - **Shellfish Farms** – 300 licensed farmers, 75,000 acres of shellfish farms are available for cultivation in Connecticut's coastal waters, producing 450,000 bushels of hard clams and 200,000 bushels of oysters, and \$30 million in shellfish products per year, the fastest growing agriculture sector in the state.

It is estimated that for every \$1 million of expenditures in agriculture, that between 20 to 40 jobs are created (e.g., 5, 8, and 35 jobs per \$1 million of expenditures from poultry and egg production, dairy cattle and milk production, and commercial fishing, respectively).²³

Farms require on average 35 cents in Cost of Community Services (“COCS”) for each dollar of property tax paid, in comparison to 25 cents for commercial and industrial, and \$1.12 for residential.

²⁰ 2017 Census of Agriculture – Connecticut (14)

²¹ \$4.8 billion value of land and buildings and \$0.3 billion value of machinery and equipment

²² US Census Bureau, 2020

²³ “Climate 21 Project” transition memo for the US Department of Agriculture

5. Target

There are two potential targets for agriculture in Connecticut – Farmland Preservation Program for Connecticut or Forestland and Farmland Protection in New England.

Farmland Preservation Program in Connecticut – 130,000 Acres

The long-term goal of the Farmland Preservation Program, which was set back in the 1980's, is to preserve 130,000 acres of farmland – see Table 4.

Table 4. Progress Towards the Farmland Preservation Program Target in Connecticut

3,205,762 Acres Land in Connecticut					2,824,223 Acres Non-Farmland
381,539 Acres ²⁴ Farmland					
148,609 Acres Farmland	113,355 Acres Woodland	31,923 Acres Pastureland	87,652 Acres Other ²⁵		
130,000 Acres Preserved Farmland Goal					
48,744 Preserved		81,256 Acres Not Preserved			

As of October 2020, the Farmland Preservation Program has protected nearly 49,000 acres on 418 farms with agricultural conservation easements – leaving 81,000 acres of farmland left to preserve.²⁶ If the average real estate value of an acre of farmland in Connecticut in 2019 was \$12,200, and Purchasing Development Rights (“PDR”) is 30-50% of value, then between \$300 to \$500 MM of public investment (e.g., through DoAg and/or USDA-NRCS) would be needed to protect 81,000 acres of farmland to achieve the 130,000 acres of farmland preserved target.

If 100% of Connecticut farms incorporated better management practices that had the potential to remove carbon from the atmosphere, including non-till, legume cover cropping, and spreading more compost, it would remove 94,902 MTCO₂e from the atmosphere each year²⁷ – the equivalent of 150 MW of residential solar PV.²⁸ USDA expects to reduce net emissions and enhance carbon sequestration by more than 120 million MTCO₂e per year by 2025.

Wildlands and Woodlands Vision for New England – 70 and 7 by 2060

The Wildlands and Woodlands vision calls for retaining and permanently protecting (e.g., conservation easements) at least 70 percent of the landscape in forestland (i.e., 90% woodlands and 10% wildlands) and another 7 percent in farmland by 2060 – see Figures 6 and 7.

Figure 6. Wildlands and Woodlands Vision for New England in 2060

²⁴ USDA Economic Research Service – 2017 data

²⁵ Land in house lots, ponds, roads, wasteland, etc.

²⁶ Connecticut Department of Agriculture, Farmland Preservation Programs Report (January 2022)

²⁷ “Planning for Agriculture – A Guide for Connecticut Municipalities: Emerging Agricultural Trends” by the American Farmland Trust and Connecticut Department of Agriculture (2020 Edition) (Page 17)

²⁸ Based on Connecticut Green Bank analysis – see Annual Comprehensive Finance Report for FY21 (p. 218-241)

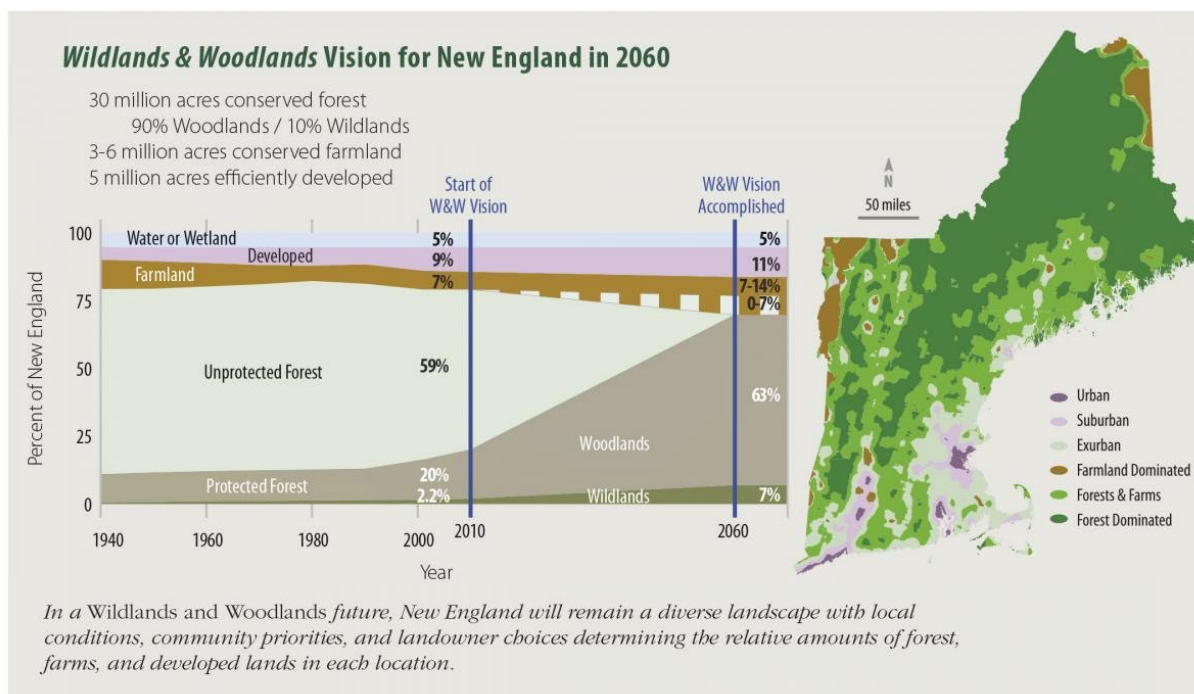
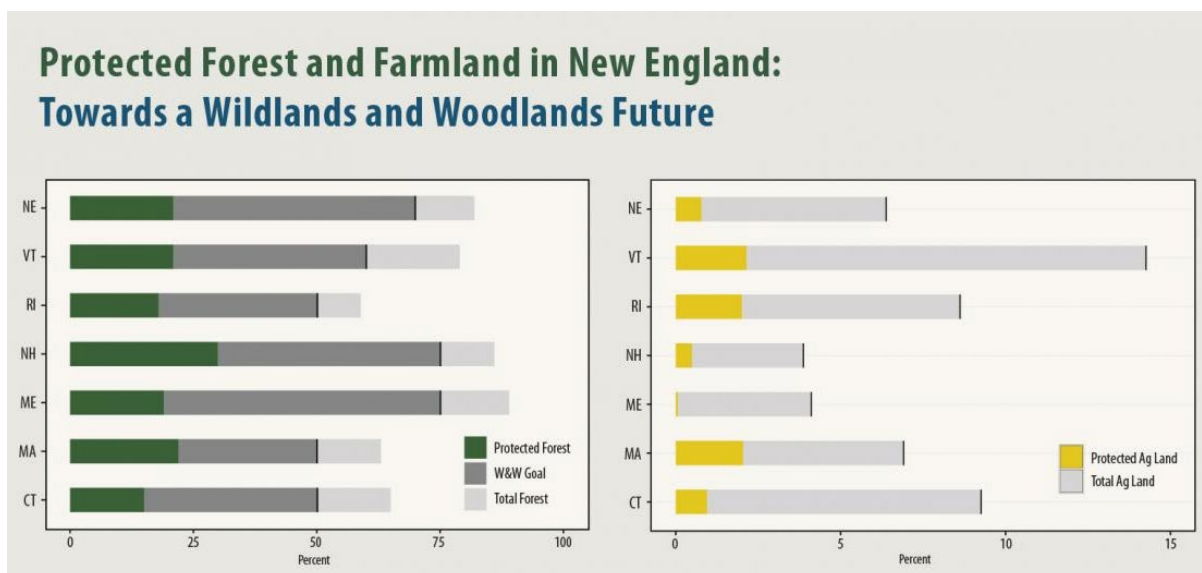


Figure 7. Protected Forestland and Farmland in New England



The single greatest challenge for achieving this goal is funding for the purchase of land and especially of easements on private lands to ensure that they remain undeveloped in perpetuity.

Forestland

Currently, in Connecticut, 59% of land is forestland (i.e., 1,873,471 acres) – of which, approximately 33% of forestland is protected by Public Act 490 (i.e., 622,490 acres).²⁹ Not only would a “no net loss of forestland” policy have to be pursued, but an additional 222,853 acres of developed land (i.e., excluding wetlands or 7% of additional land cover) would have to be converted to forestland to achieve the 70 percent of landscape as forestland target (i.e., about 6,400 acres per year). This would require growing smarter in cities and suburbs by encouraging efficient land use and smart growth, and redeveloping built landscape such as former industrial mills on recovering rivers and commercial brownfields. A significant effort would have to be initiated to permanently protect the 2,225,477 acres (i.e., 70% of land) as forestland through property tax benefits, conservation easements, and/or other mechanisms.

Farmland

Currently, in Connecticut, 7% of total land is farmland (i.e., 233,847 acres) – of which, about 46,000 acres or 20% is protected by agriculture conservation easements.³⁰ A “no net loss of farmland” policy would have to be pursued, and continued efforts to permanently protect farmland would require going beyond property tax benefits towards securing agriculture easements.

6. Funding and Financing Programs

The following is an alphabetic breakdown of the current funding (i.e., grants) programs in support of “agriculture” in Connecticut, including, but not limited to:

- **Agriculture Conservation Easement Program** (“ACEP”) – USDA-NRCS’s ACEP protects the agriculture viability and related conservation values of eligible land through agricultural land easements that help private and tribal landowners, land trusts, and other entities such as state and local governments protect croplands and grasslands on working farms and ranches by limiting non-agricultural uses of the land through conservation easements. Under the Land Easement component, the Natural Resources Conservation Service (“NRCS”) of the USDA, may contribute up to 50 percent of the fair market value of the agricultural land easement (i.e., matching resources for DoAg Purchase of Development Rights (“PDR”) program), and up to 75 percent where NRCS determines that grasslands and special environmental significance will be protected. Projects must have non-federal matching funds in hand.
- **Connecticut Farmland Preservation Program** (CGS 7-131d) – administered by DoAg to leverage state, local, and private funds to permanently protect farms. Initiated in 1978, is funded by state bonding and the CIA, and has four (4) public policy priorities – open space (i.e., DEEP), agriculture preservation (i.e., DoAg), historic preservation (i.e., DECD), and affordable housing (i.e., CHFA).

Since 1978, DoAg has permanently protected 386 farms on 46,142 acres (i.e., about a third of the total acreage goal) by awarding \$128 MM in Farmland Preservation Program

²⁹ Including forestland, open space land, and other lands

³⁰ These are DoAg supported easements, and does not include easements through DEEP’s OSHA program (i.e., see Land Conservation), nor USDS-NRCS programs.

grant funds (or \$2,778/acre).³¹ Current law allows the Commissioner the ability to pay up to \$20,000 per acre, subject to appraisal.

It should be noted that USDA NRCS contributes \$2-\$4 million per year to the program as partners.

- **Connecticut Open Space and Watershed Land Acquisition Grant Program** (“OSWA”) (CGS 7-131d) – a matching grants program to provide financial assistance to municipalities, land trusts, and water companies to acquire open space and watershed lands, including the Urban Green and Community Garden Program for vulnerable communities. Initiated in 1998, is funded by state bonding and the CIA, provides financial assistance to municipalities and nonprofit land conservation organizations to acquire land for open space, and to water companies to acquire land to be classified as Class I or Class II water supply property, and is administered by DEEP to leverage state, local, and private funds to create a cooperative open space acquisition program.

Since 1998, DEEP has awarded over \$150 MM in open space grant funds to protect over 41,000 acres (or \$3,659/acre).

- **Connecticut Agriculture Viability Grants Program** – for matching grants up to \$50,000 to plan and implement local farmland preservation strategies, to institute agriculture-friendly land use regulations, or to develop marketing initiatives to support local farm businesses.
- **Conservation Stewardship Program** (“CSP”) – for producers who practice conservation and environmental stewardship, by providing them technical and financial assistance through the USDA-NRCS to help them advance their efforts adopting additional conservation activities and maintaining their baseline level of conservation.
- **Emergency Watershed Protection Program** – program administered by NRCS to respond to floods, fires, windstorms, and other natural disasters. The program funds removing debris, protecting eroded banks, correcting damaged drainage facilities, repairing levees, and purchasing flood plain easements. For construction activities, it provides up to 75% of the project costs.
- **Environmental Quality Incentives Program** (“EQIP”) – cost-share assistance program that provides up to 75 percent (90 percent for historically underserved producers) of the cost to implement certain structural and management practices on eligible agricultural land, including the following management practices: conservation tillage, cover cropping, nutrient management, and integrated pest management. EQIP payments are capped at \$450,000 in aggregate payments over five years.
- **Farmland Restoration Grant Program** – a component of the climate-smart agricultural practices bill that passed the Connecticut General Assembly 2022 session, will provide farmers with resources to implement climate-smart practices.

³¹ Status of State PACE Programs by the American Farmland Trust and USDA’s Farmland Information Center

The following is a breakdown of the current financing (i.e., loans, tax credits) programs that could support agriculture in Connecticut:

- **Business and Industry Loan Guarantee Program** – through the USDA’s Rural Development programs, this program provides a loan guarantee that allows businesses to work with commercial lenders who might not otherwise extend credit. A borrower may be a cooperative organization or a number of other forms, including individuals and land trusts. Loans can be used for preventing a business from closing, expand or convert a business, or purchase land, machinery, or equipment. The total loan amount may not exceed \$10 MM.
- **Municipal Loan Program** (CGS 22-26mm) – the Commissioner of Agriculture shall administer a program providing eligible municipalities with a loan for purchasing or agricultural lands, through the “municipal purchasing of agricultural land account” within the General Fund. Such loan shall be for a period not to exceed five years and shall not be subject to interest. Municipalities shall be eligible for such loan if they provide not less than twenty percent of the purchase price of such lands and may apply for such loan on a form prescribed by the Commissioner.
- **Rural Energy Savings Program** (“RESP”) – RESP provides loans to rural utilities and other companies who provide energy efficiency loans to qualified consumers to implement durable cost-effective energy efficiency measures. The terms of the RESP loans are up to 20 years at 0% interest rate, up to 5% interest rate for relending to end-use customers for up to 10 years, and up to 4% of the loan may be used for start-up costs. Funds may be used for the purpose of implementing energy efficiency measures to decrease energy use or costs for rural families and small business. On September 20, 2020, the Green Bank submitted an application into the USDA’s Rural Utilities Service’s RESP to borrow \$10 MM for the purpose of financing clean energy projects in rural communities throughout Connecticut. The proceeds from the RESP would be used as capital to finance projects through the Green Bank Solar PPA, Capital Solutions, and C-PACE programs, along with Shared Clean Energy Facilities projects. As of June 1, 2022, the USDA has not yet made a determination on the Green Bank application.
- **Tax Considerations** – per Internal Revenue Code section 170(h) criteria, donations of agricultural conservation easements generally qualifies as a tax-deductible charitable gift. This means that a landowner can claim the value of the easement as a federal income tax deduction. The value of an agricultural conservation easement is the difference between the property’s fair market value (the “before” value) and its value as restricted by the easement (the “after” value) as determined by a qualified appraiser. Landowners may claim a federal tax deduction for a donated portion of a sale (i.e., difference between easement appraised value and its actual sales price). The federal tax code in 2006 established an enhanced tax deduction for conservation easements that allows landowners to claim a deduction of up to 50 percent of their adjusted gross income in any given year and to spread those deductions over a period of 15 years – corporations are limited to 10 percent deductions.

Accessing funding or financing resources for agriculture in Connecticut can be difficult. Identifying new mechanisms to access additional funding and financing resources, especially

those that seek to unlock more private capital investment, could provide a catalyst to increase and accelerate investment in agriculture in Connecticut. The Infrastructure Investment and Jobs Act (“IIJA”) presents an opportunity to access funding and financing resources through formula or competitive grants for “agriculture”.

7. Other Programs

The following are other items of note with respect to “agriculture”:

- **Connecticut Farm Link Program** – established by DoAg in 2007, and funded by CIA, it connects farmers seeking land with farmland owners looking to sell or lease acreage. CT Farmlink provides resource information and some technical assistance about farm leasing, farm transfer, farm succession planning, family farm estate planning, and farm transfer strategies. www.ctfarmlink.org
- **COMET Farm** – is a farm and ranch carbon and greenhouse gas accounting system developed by the USDA-NRCS. The tool guides farmers through describing how their farm and ranch management practices compare the carbon changes and greenhouse gas emissions between current and future scenarios. <https://comet-farm.com/Home>
- **Center for Land-Use Education and Research (“CLEAR”)** – within the College of Agriculture, Health, and Natural Resources at the UCONN, CLEAR’s mission is to provide information and assistance to land-use decision-makers and other audiences in support of better land-use decisions, healthier natural resources, and more resilient communities. <http://clear.uconn.edu/projects/landscape/CT/landcoverviewer.htm#top>
- **Open Space Review Board** – is an independent advisory group of volunteers appointed by the Governor and leadership within the CGA under CGS 7-131(e) to oversee OWSA and RNHT programs.
- **Various Other Boards and Councils** – including, but not limited to Connecticut Farm Wine Development Council, Connecticut Food Policy Council, Connecticut Seafood Development Council, Farmland Preservation Advisory Board, and DEI in Connecticut Agriculture Working Group.³²

8. Stakeholder Outreach

In an effort to understand the public policy and marketplace context for “agriculture” in Connecticut, the Green Bank met with many organizations.³³

³² <https://portal.ct.gov/DOAG/Boards/Boards/Boards-Councils-and-Commissions>

³³ **Agriculture** – American Farmland Trust, Berkshire Agriculture Ventures, City Seed, Connecticut Farm Bureau Association, Connecticut Farmland Trust, Connecticut Resource and Conservation Development, Dirt Capital Partners, DoAg, Gather New Haven, Green Wave, The Last Green Valley, Natural Resources Conservation Service, UCONN, Washington State Housing Finance Commission, Working Lands Alliance, and Yale Forest School

Land Conservation – American Forest Foundation, Audubon Connecticut, Connecticut Audubon, Connecticut Land Conservation Council, Conservation Finance Network, DEEP, Ecosystem Investment Partners, Goldman Sachs, Highstead, New England Forestry Foundation, New England Society of American Foresters, Quantified Ventures, Save the Sound, The Nature Conservancy, TNC’s Nature Vest Program, and Yale Forest School

Parks and Recreation – Connecticut Forest and Parks Association, Connecticut Greenways Council, Connecticut Recreation and Parks Association, DEEP, Green Eco Warriors, Keney Park Sustainability Project, Sierra Club, Trust for Public Lands, and Urban Resources Initiative.

These 16 agriculture-related organizations primarily represent non-profit organizations but included public and for-profit organizations as well.

The objectives of these one-hour conversations included:

- **Introductions** – to get a better understanding of the mission and initiatives of the various public, nonprofit, and for-profit stakeholders operating within the “agriculture” space, and to introduce the Green Bank;
- **Environmental Infrastructure** – inform the various stakeholders about the “environmental infrastructure” policy,³⁴ process the Green Bank is pursuing to develop a Comprehensive Plan, and to elicit discussion on the following areas:
 - **Relevance** – how relevant “environmental infrastructure” and its components (e.g., agriculture) are to the stakeholder’s mission and initiatives;
 - **Policies and Targets** – what local, state, and federal policies (e.g., Community Investment Act), including plans (e.g., Green Plan) are important from the stakeholder’s perspective, and what targets (e.g., 130,000 acres of preserved farmland) are they seeking to achieve;
 - **Metrics** – what are the key metrics stakeholders believe are important in terms of monitoring and evaluating success from investments in “environmental infrastructure” improvements and “agriculture”;
 - **Vulnerable Communities** – how does the stakeholder’s organization think about the impacts that must be addressed from climate change to build the resilience of vulnerable communities;³⁵ and
 - **Stakeholder Identification** – who else should the Green Bank meet with on the topic.

From these conversations, the Green Bank was able to develop a better understanding as to the role it might play in terms of financing “agriculture” from the perspective of its mission – to confront climate change.

9. Findings

³⁴ Public Act 21-115 – An Act Concerning Climate Change Adaptation”

³⁵ As defined by Public Act 20-05

Based on the various meetings with public, nonprofit, and private stakeholders, the following are key findings with respect to agriculture (it should be noted that additional findings have been generalized in the footnote):³⁶

- **Consistent with Mission to Confront Climate Change** – “agriculture,” including its lands and a range of stewardship practices by farmers, ranchers, and forest landowners, sequester carbon and reduce GHG emissions, while also improving resilience to extreme weather (e.g., flood control), and therefore is consistent with the Green Bank’s mission to “confront climate change”. As the impacts of climate change are outpacing the ability for gray infrastructure (e.g., stormwater systems) to manage it, green infrastructure (e.g., agriculture) provides an excellent ability to mitigate flooding, and sequester carbon through climate smart practices and resilience through production of commodities (e.g., carbon offsets, ecosystem services).
- **Agricultural Land is an Endangered Species** – there is a need to slowdown the loss of farmland in Connecticut from development, and protect it to provide benefits (e.g., food security,³⁷ public health, local and regional economic development, housing) to citizens and communities of Connecticut – if we lose it, it is gone forever. The cost of community services (“COCS”) versus the potential for local property tax revenues³⁸ come into conflict for land-use planners when faced with decisions to support agriculture versus development. It is important to not only protect marginal farmlands, but to specifically protect prime farmland because maintaining and continuously improving soil quality is vital for delivering the full benefits agriculture industry can provide across the state. Clean energy development (e.g., large solar fields or large scale solar) is adversely impacting farmlands, especially when sited on prime farmland. Dual-use solar on land (e.g., agrivoltaics) that has not been designated prime farmland by DoAg, nor important by USDA-NRCS could be explored.
- **Business is Difficult but Necessary** – the \$580 MM agriculture industry in Connecticut³⁹ bears significant expenses. Primary amongst the cost of farming in Connecticut is labor (i.e., \$170 MM), equipment and supplies (\$49 MM), energy (i.e., \$44 MM),⁴⁰ and interest from debt (\$14 MM). In managing profits and expenses, farmers, generally, resist debt because loans create challenges to profit margins. With the everchanging climate, weather patterns are creating challenges to growing seasons and there is a need to invest in the modernization of infrastructure for the agriculture industry in Connecticut (e.g., urban agriculture, smart farms, livestock processing, distribution networks) to make

³⁶ Additional findings – there are a number of additional funding sources for agriculture assistance (e.g., Supplemental Nutrition Assistance Program or “SNAP”, Women, Infants, and Children or “WIC”), eel grass is for water as lichen is for air, kelp starts to deteriorate in 24 hours, can sink kelp to store carbon, farms must be places for food production and not a living space for the rich, role of local land-use boards determining battlegrounds for agriculture, value of volunteer time for federal resource match is \$33 per hour, need for crop insurance as filing for losses is cumbersome and not currently being practiced, PFAS contamination, manure management problems from phosphorus, culverts being undersized, stream bank erosion, dam removal (i.e., \$800,000 cost) vs. improvement (i.e., \$9 MM cost last for 50-100 years), from seeds to soils.

³⁷ It should be noted that based on data from the Bureau of Economic Analysis, 11.8% of households in Connecticut experience food insecurity – with 4.9% as very low food secure households.

³⁸ And the impacts of Public Act 490 on use value for local property taxation

³⁹ 2017 Census of Agriculture – Connecticut (7)

⁴⁰ Other major expenses include seeds, plants, vines, and trees (i.e., \$60 MM), feed (i.e., \$52 MM), and depreciation (\$33 MM)

the state more resilient to such dramatic changes.⁴¹ Crop insurance – of which about 74% or 290 million acres in 2016 and \$8 billion from the federal government in 2019 subsidizing the crop insurance system – protects farmers against large financial loss caused by crop failures or market fluctuations (e.g., commodity price fluctuations).⁴²

- **Money is Not Always the Problem** – as important as local, state, federal, and private funding and financing resources are, sometimes not having enough people in government (e.g., streamlining farmland protection efforts), shortage of farm labor, having onerous processes (i.e., “red tape”), an inability to speak to co-benefits (e.g., job creation, resilience), or lack of understanding of important tools (e.g., conservation finance) can substantially inhibit progress towards increasing investment in agriculture.
- **Need Mechanisms to Monetize Environmental Markets** – stakeholders recognize that environmental markets (e.g., carbon offsets, ecosystem services) may be able to provide additional sources of revenue from “climate-smart practices”^{43,44} to support the growth and development of the agriculture industry in Connecticut. Successful projects require public and/or private recognition of environmental commodity value, involvement of producers (i.e., farmers, including those who are working farmlands, pasturelands, and forestlands) adopting “climate-smart practices,” engagement of scientists and conservation organizations providing technical assistance, credit-worthy long-term purchasers of such commodities, and reliable certifiers and verifiers.
- **Blue Agriculture Potential** – regenerative ocean farming of seaweed and shellfish (i.e., Integrated Multi-Tropic Agriculture or “IMTA” or “3D-Ocean Farming”) is a Connecticut innovation.⁴⁵ Connecticut’s blue agriculture industry is not an offshore fisheries industry, but instead a \$30 MM shellfish industry in the estuary waters of Connecticut and New York’s Long Island Sound. Farmers can bid for 5 to 15-year leases (i.e., 75,000 acres) and request permits to farm (i.e., currently 25,000 acres of active production) for seaweed and shellfish to produce 10 to 30 tubs of seaweed and 250,000 shellfish per acre, which as a bio-remediator absorbs nitrogen and phosphorus from non-point source pollution (e.g., stormwater and combined sewage overflow from Connecticut, air pollution from the west) and store carbon,⁴⁶ generate \$300,000 in revenue per farm, and provide 2 to 3 fulltime jobs and 7 to 10 seasonal jobs.⁴⁷ Seaweed can also produce bioplastics, bioenergy, and other consumer products.

⁴¹ As highlighted by the public health impact of COVID, there are only 3 days of perishable food available this side of the Hudson.

⁴² “The Case for Crop Insurance Reform” by Cortney Ahern Renton and Claire Huntley Lafave in the Conservation Finance Forum (April 8, 2020)

⁴³ Native Energy produced carbon offsets (certified by the Voluntary Carbon Standard) from the 275-acre Laurel Brook Farm in East Canaan from over 800 cows producing 2,000 TCO₂ offsets per year

⁴⁴ Various agricultural and forestry practices (e.g., replacing synthetic nitrogen over time, soil health shares) within the COMET planner and 2017 NASS AgCensus data within the United States Climate Alliance Report

⁴⁵ <https://www.youtube.com/watch?v=6GchLfXTgII>

⁴⁶ Through the Kelp Climate Fund, Green Wave provides farmers \$0.10/pound of kelp farmed - <https://www.greenwave.org/kelp-climate-fund>

⁴⁷ Seaweed is 25% carbon and about 2-3% nitrogen according to Green Wave

- **Impact Metrics** – the following is a “high level” breakdown of the types of metrics appropriate for agriculture – see Table 5.

Table 5. Relevant Metrics Identified by Stakeholders on Agriculture

Inputs	Outputs	Outcomes
<ul style="list-style-type: none"> ○ # of Farmers ○ Diversity of Farmers ○ # of Farms ○ Types of farms (farmlands, pasturelands, forestlands, oceanlands) ○ Acres of Farms ○ New farmlands (e.g., community gardens, controlled environment agriculture) ○ New practices (e.g., climate-smart) ○ Infrastructure Investment ○ Agricultural Conservation Easements ○ Programs for BIPOC farmers ○ Municipal land-use boards support of agriculture ○ Location of farms (e.g., urban farms) 	<ul style="list-style-type: none"> ○ Produce ○ Types of Produce ○ Culturally relevant crops ○ Agriculture revenues and expenses (including per acre) ○ Wholesale and retail price ○ Infrastructure (e.g., housing, production, processing, distribution, energy costs) ○ Cost to transport ○ Community Supported Agriculture subscriptions ○ Protected farmland 	<ul style="list-style-type: none"> ○ Profitable Connecticut Grown producers ○ Increased ownership of farms by BIPOC farmers ○ Connecticut Grown consumers ○ Climate smart commodities (e.g., carbon offsets) including total, price, and term ○ Ecosystem services (e.g., resilience, public health, water quality, soil quality) ○ Jobs ○ Food security (e.g., reduced food imports) ○ Fewer crop losses (e.g., crop insurance claims)

- **Vulnerable Communities** – even though BIPOC represent nearly one-quarter of the U.S. population, they operate less than 5% of farms, and cultivate less than 1% of farmland – in Connecticut, approximately 1.4% of farmers are BIPOC, compared to the BIPOC population being nearly 37% in the state.⁴⁸ About 6.5% of farms and 10.0% of farmland is operated by tenant farmers who own none of their land. Increasing BIPOC access to farming and ownership of farms by BIPOC entrepreneurs is needed.

These are the key findings from the stakeholders on agriculture.

10. Opportunities

The following is a list of opportunities for consideration by the Green Bank given the broad categories of information and data, environmental markets and conservation finance, funding and financing sources, and other potential opportunities:

1. **Information and Data** – as a foundation, access to high quality information is important from which to base decisions. The following is a breakdown of opportunities for consideration with respect to information and data:

⁴⁸ “Farmland Needed – How Connecticut Can Help Farmers Access the Land They Need to Succeed” by the American Farmland Trust and Connecticut Department of Agriculture (January 2021)

- A. **Connecticut Grown** – is the marketing brand for promoting products made in Connecticut and sold to consumers. Continuing to increase the awareness of the logo by and the purchasing of products from consumers is an important demand-side approach for fostering the sustained orderly development of the local agriculture industry. Considering community-based marketing approaches such as Solarize,⁴⁹ into an agriculture-focused community-based campaign for CSA's, farmers markets, food waste collection, etc. can increase consumer demand for Connecticut Grown products.
 - B. **Connecticut Farm Link** – to improve the capabilities of connecting farmland owners to farmland seekers and producers, support for improving the Connecticut Farm Link technology may be necessary. Currently, there are more farmland seekers than owners, and farmland owners rely on traditional realtor sites like Zillow and Realtor.com to list their properties.
 - C. **Land Grant and Sea Grant Universities** – Connecticut has robust land grant (i.e., UCONN – Storrs) and sea grant (i.e., UCONN – Avery Point) universities, and the Yale School of the Environment's Forestry School, which owns nearly 8,000 acres of managed forestland in Connecticut. Utilizing these resources for research, education, and outreach to confront climate change through agriculture is necessary.
 - D. **Yale School of the Environment** – Yale School of the Environment, and its work supporting conservation finance (e.g., partnership with the Conservation Finance Network) presents a unique opportunity to continuously inform and develop conservation finance practitioners in Connecticut. The Green Bank should consider providing local stakeholders with access to information (e.g., promoting Conservation Finance Network) and professional development opportunities (e.g., sponsorship of bootcamps on conservation finance) to accelerate the advancement and practice of conservation finance in Connecticut.
 - E. **Land Trusts** – included within the data warehouse the inventory of land trusts across the state where there are easements held.
2. **Environmental Markets and Conservation Finance** – in terms of identifying potential carbon offset and/or ecosystem services revenue streams within compliance and voluntary markets that can support financing of agriculture, the following is a breakdown of opportunities for consideration with respect to environmental markets and conservation finance:
- A. **Partnership for Climate-Smart Commodities** – see below under “Funding and Financing” section.
 - B. **Procurement** – similar to power purchase agreements for clean energy, assisting producers connect with consumers of climate-smart products and commodities

⁴⁹ <https://cbey.yale.edu/research/solarize-your-community-an-evidence-based-guide-for-accelerating-the-adoption-of>

through guaranteed offtake agreements,⁵⁰ including community-supported agriculture.

3. **Funding and Financing Sources** – in terms of identifying additional funding (i.e., grants) and financing (e.g., loans) that can increase and accelerate investment, the following is a breakdown of opportunities for consideration with respect to funding and financing of agriculture:

- A. **Green Liberty Bonds** – issue a \$25 MM bond⁵¹ to raise proceeds to support investments in agriculture, including, but not limited to:

- i. **Pilot Revolving Loan Fund for Buy-Protect-Sell (or Lease to Own)** – modelling the Farmland Protection and Affordability Investment (“Farmland PAI”) Program of Washington State, working in collaboration with DoAg and nonprofit agricultural conservation organizations, provide loans to land trusts to help them move quickly to permanently protect critical farmland from development. A \$25 MM pilot revolving loan fund⁵² would offer low interest rates and better terms to support land trusts buy land now for later protection and management (i.e., working land easements), and sale (or lease), including priority for BIPOC farmers and farm ownership. The Green Bank needs to understand if it can pursue this approach as a foundational strategy for agriculture (and land conservation). A growing number of states also offer loan programs to assist beginning farmers and ranchers with eligible purchases of farmland, equipment, buildings, and livestock through Aggie Bonds.⁵³ Food systems are ripe for the attention that state and municipal clean energy bond finance has received over the last decade from philanthropy and green banks providing credit enhancements to strengthen credit ratings of municipal bonds.⁵⁴
- ii. **Infrastructure Modernization** – working with DoAg, to identify opportunities to invest in critical agriculture industry infrastructure modernization projects (e.g., production, processing, and distribution facilities, resource hubs, cooperative farming models) that would support climate-smart practices and products to develop and grow in the Connecticut marketplace.⁵⁵ This would also include financing physical infrastructure such as food and farm-waste to energy projects, food banks, regional markets, equipment, and industrial kitchens – and technological and promotional infrastructure such as Connecticut Farm

⁵⁰ <https://www.conservationfinancenetwork.org/2019/07/24/how-guaranteed-offtake-can-drive-sustainable-agriculture>

⁵¹ Amount is for discussion purposes only, and set at an amount to match a Connecticut proposal into the USDA’s Commodity Credit Corporation’s “Partnership for Climate Smart Commodities” funding opportunity announcement.

⁵² Assuming the average price for agriculture land is \$12,200 per acre, this fund could support over 2,000 acres of farmland, revolving on average every 5 years.

⁵³ <https://www.cdfa.net/cdfa/cdfaweb.nsf/0/3515CC91CAB651C1882579360059F5E7>

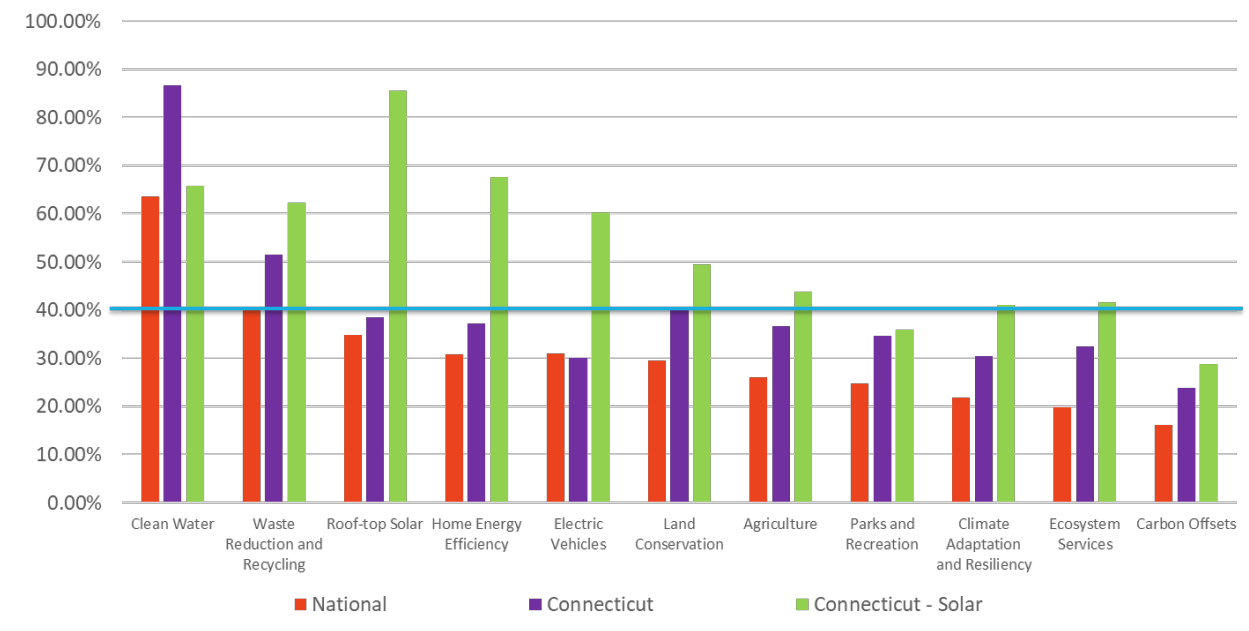
⁵⁴ “Soil Wealth: Investing in Regenerative Agriculture across Asset Classes” by Croatan Institute, Delta Institute, and Organic Agriculture Revitalization Strategy (July 2019)

⁵⁵ For example, providing financing to the redevelopment of Connecticut’s Regional Agriculture Market in Hartford in collaboration with DoAg and CRDA

Link, “Connecticut Grown – Climate Smart,” and direct delivery of community supported agriculture memberships. Low cost and long-term financing for clean energy (e.g. dual-use solar, battery storage, combined heat and power, fuel cells) to lower energy costs and meet qualifications for forage and crop yield should be considered.

From research conducted by the Green Bank, it can be seen that retail investors in bonds are interested in agriculture, including Connecticut citizens who are also interested in investing in rooftop solar and home energy efficiency – see Figure 8.

Figure 8. Retail Investor Use of Proceed Interest in Clean Energy and Environmental Infrastructure



- B. Partnership for Climate-Smart Commodities** – working with UCONN and DoAg, UCONN submitted a \$50 MM proposal, that would have been matched by a \$25 MM Green Liberty Bond, through the \$1 billion competitive solicitation of the United States Department of Agriculture’s (“USDA”) Commodity Credit Corporation (i.e., USDA-NRCS-COMM-22-NOFO0001139) in response to the climate crisis by supporting actions within the agriculture sector to produce climate-smart commodities.⁵⁶ As the lead primary applicant, UCONN would support producers adopt and sustainably implement climate-smart practices, and as the co-lead, the Green Bank, with its expertise from the Residential Solar Investment Program (see Figure 9), would adapt the clean energy model to climate-smart agriculture (see Figure 10). Included with the proposal is \$5 MM for performance-based incentives based on certified and verified carbon offsets. The project submitted by UCONN, in the end, wasn’t supported by the USDA.

⁵⁶ Defined as an agricultural commodity that is produced using agriculture (i.e., farming, ranching, or forestry) practices that reduce greenhouse gas emissions or sequester carbon.

However, DoAg subsequently released a \$14 MM grant program in support of climate smart agriculture in Connecticut.

Figure 9. Residential Solar Investment Program – From SHRECs to Green Liberty Bonds

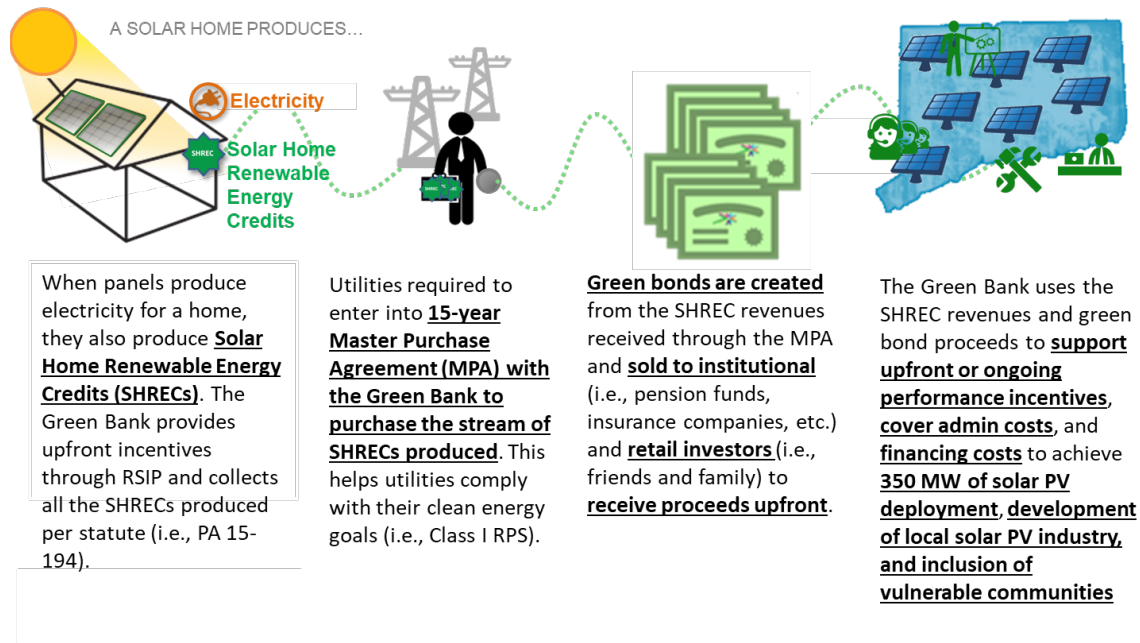
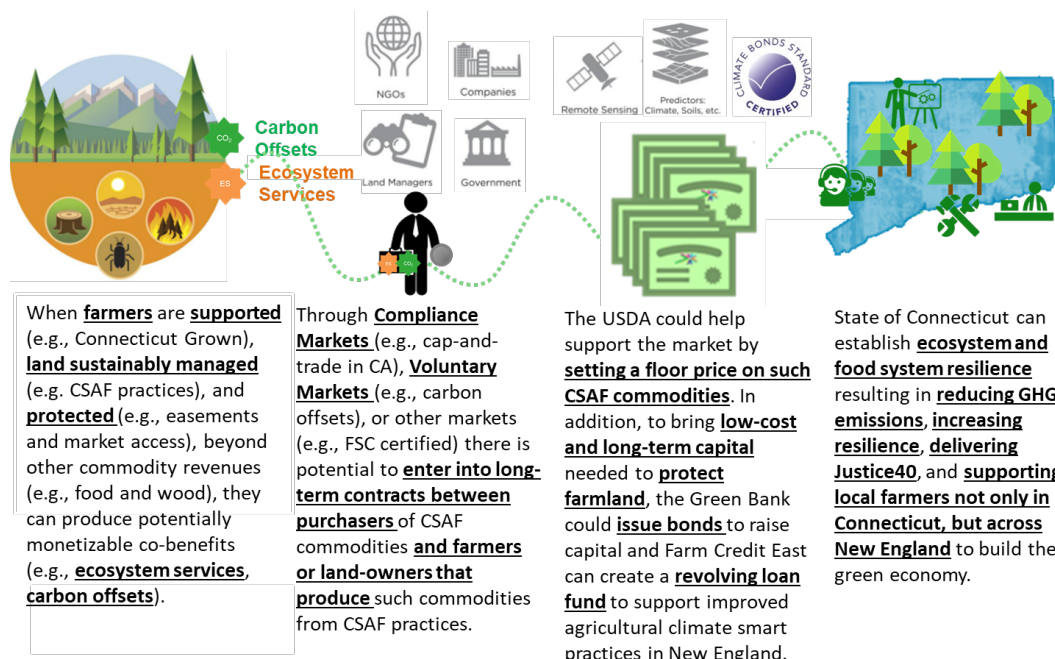


Figure 10. Climate Smart Controlled Environment Agriculture (CEA) for Tribes and Small Farms in New England: Building Profitable, Sustainable and Resilient Farms



C. Community Match Fund (“CMF”) – a program of Sustainable CT, the Community Match Fund provides fast, flexible funding, and support for community

engagement on a wide-range of sustainability projects. This societal value uses an innovative, online tool to connect grant contributions from the “crowd,” which are matched by various donor interests, including, but not limited to individuals, foundations, and the State of Connecticut. As of January 1, 2022, the Fund has raised \$1.3 MM from nearly 10,000 individual contributors, which was matched by \$1.1 MM from various sponsors, and supported 195 projects. The Green Bank could consider working with entities like Sustainable CT, with tools like the CMF, to enable funding for agriculture to be matched by the crowd, while also ensuring that equity and vulnerable communities are front and center in receiving the benefits of such investment.

4. Other Potential Opportunities – there are a number of other potential opportunities that can support financing of agriculture, including:

- A. Public Policy** – working with DoAg, consider public policies to advance farmland protection in Connecticut with the goal of “no net loss of farmlands and forestlands to development,” including, but not limited to:
 - i. Establishing Statutory Goals** – similar to the Open Space goal (i.e., 22% by 2023, which may include agriculture), renewable energy goal (i.e., RPS), and GHG emission reduction goal (i.e., Global Warming Solutions Act), establish targets for farmland protection as the foundation to goal setting, including bringing new farmers into the agriculture industry.
 - ii. Negative Emissions** – as proposed by the Connecticut Forest and Parks Association with respect to Senate Bill 10, add a “negative emissions” definition,⁵⁷ require “negative emissions” in GHG emissions inventory, and recognize the importance of nature-based solutions within the Global Warming Solutions Act.
 - iii. Conservation Finance Act** – consider public policies that provide incentives for performance-based outcomes modelled after proposed Senate Bill 348 “Conservation Finance Act” in Maryland,⁵⁸ which would enable more private investment in nature-based solutions that result in measurable improvements to ecosystems, including carbon offsets and ecosystem services.
- B. Sustainable CT** – commits municipalities to take on a variety of tasks to promote sustainability and earn points for community designation, including “Developing Agriculture-Friendly Practices,” including:
 - i. 4.3.1** – adopt land use policies and regulations that allow and support active agricultural uses;

⁵⁷ “Negative emissions” means greenhouse gases that are removed from the atmosphere through nature-based solutions such as soils, forests, wetlands, and other working or natural lands, or through negative emissions technologies.

⁵⁸ <https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/SB0348>

- ii. **4.3.2.** – allow active agriculture use of municipal land or provide outreach on CT Farmlink (linking available municipal or private lands to farmers looking for land to farm).
- iii. **4.3.3.** – develop a Transfer or Purchase of Development Rights program.
- iv. **4.3.4.** – hold a farmer forum to identify critical needs or issues for agriculture in the community.

Promote the existing areas noted above while exploring the possibility of additional points to advance agriculture in Connecticut.

- C. **Commitment to Prime Farmland** – given their inefficiency⁵⁹ and footprint, and given the importance of quality soil for agriculture and food security, the Green Bank should consider never providing capital to finance solar PV projects on prime farmland unless dual-use solar (e.g., agrivoltaics). It should be noted that the Green Bank has financed clean energy projects on farmland (i.e., farm waste to energy – AD and CHP)⁶⁰ and forestland (i.e., wind power).⁶¹

These are a few of the opportunities identified by the Green Bank to support its mission and advance agriculture in Connecticut. Developing a method for prioritizing what opportunities under consideration are ultimately pursued, given the limited human and financial resources, and organizational structure of the Green Bank, is an activity for a later date.

11. References

In addition to the conversations with stakeholders, the Green Bank reviewed the following documents to support its findings and opportunities:

- **Building Blocks for Climate Smart Agriculture and Forestry** – A USDA resource, including Implementation Plan and Progress Report (May 2016)
- **Conservation Options for Connecticut Farmland** – A Guide for Landowners, Land Trusts, and Municipalities (2020 Edition) by the American Farmland Trust
- **Climate 21 Project** – Biden-Harris Transition Memo for the Department of Agriculture
- **Economic Impacts of Connecticut's Agricultural Industry** – by the UCONN College of Agriculture, Health and Natural Resources: Report No. 6 (September 2017)
- **Planning for Agriculture** – A Guide for Connecticut Municipalities: Emerging Agricultural Trends (2020 Edition) by the American Farmland Trust and Connecticut Department of Agriculture

⁵⁹ Solar PV has capacity factor of 15% versus wind of 35%, hydro of 35%, AD of 30-80%, and fuel cells of 90%.

⁶⁰ <https://aggridenergy.com/fort-hill-ag-grid-digester/>

⁶¹ https://www.thewindpower.net/windfarm_en_22885_colebrook-south.php

- **Wildlands and Woodlands – Farmlands and Communities: Broadening the Vision for New England** – by The Harvard Forest, Highstead Foundation, and New England Forestry Foundation (2017)

12. Definitions

The following are important definitions when it comes to “agriculture” in Connecticut:

- **Agriculture** (CGS 1-1(q)) – shall include cultivation of the soil, dairying, forestry, raising or harvesting any agricultural or horticultural commodity, including the raising, shearing, feeding, caring for, training and management of livestock, including horses, bees, the production of honey, poultry, fur-bearing animals and wildlife, and the raising or harvesting of oysters, clams, mussels, other molluscan shellfish or fish; the operation, management, conservation, improvement or maintenance of a farm and its buildings, tools and equipment, or salvaging timber or cleared land of brush or other debris left by a storm, as an incident to such farming operations; the production or harvesting of maple syrup or maple sugar, or any agricultural commodity, including lumber, as an incident to ordinary farming operations or the harvesting of mushrooms, the hatching of poultry, or the construction, operation or maintenance of ditches, canals, reservoirs or waterways used exclusively for farming purposes; handling, planting, drying, packing, packaging, processing, freezing, grading, storing or delivering to storage or to market, or to a carrier for transportation to market, or for direct sale any agricultural or horticultural commodity as an incident to ordinary farming operations, or, in the case of fruits and vegetables, as an incident to the preparation of such fruits or vegetables for market or for direct sale.
- **Agriculture Conservation Easement** – is an easement specifically designed for agricultural land. It is a deed restriction or deed covenant that landowners donate or are paid to place on their property.
- **Aquaculture** (CGS 1-1(q)) – means the farming of the waters of the state and tidal wetlands and the production of protein food, including fish, oysters, clams, mussels and other molluscan shellfish, on leased, franchised and public underwater farmlands.
- **Community Supported Agriculture (“CSA”)** – is a food production and distribution system that directly connects farmers and consumers with Connecticut grown products. Consumers purchase shares of a farm’s harvest in advance and then receive a portion of the crops as they are harvested.
- **Conservation Easement** – is a deed restriction or deed covenant that landowners voluntarily place on part or all of their land. The easement limits development in order to protect the land’s natural resources.
- **Environmental Infrastructure** – means structures, facilities, systems, services and improvement projects related to (A) water, (B) waste and recycling, (C) climate adaptation and resiliency, (D) agriculture, (E) land conservation, (F) parks and recreation, and (G) environmental markets, including, but not limited to, carbon offsets and ecosystem services.

- **Farm** (CGS 1-1(q)) – includes farm buildings, and accessory buildings thereto, nurseries, orchards, ranges, greenhouses, hoophouses and other temporary structures or other structures used primarily for the raising and, as an incident to ordinary farming operations, the sale of agricultural or horticultural commodities.
- **Farm Land** (CGS 12-107b) – means any tract or tracts of land, including woodland and wasteland, constituting a farm unit.
- **Open Space Land** (CGS 12-107(b)(3))⁶² – open space land means any area of land, including forest land, land designated as wetland under section 22a-30 and not excluding farm land, the preservation or restriction of the use of which would (A) maintain and enhance the conservation of natural or scenic resources, (B) protect natural streams or water supply, (C) promote conservation of soils, wetlands, beaches or tidal marshes, (D) enhance the value to the public of abutting or neighboring parks, forests, wildlife preserves, nature reservations or sanctuaries or other open spaces, (E) enhance public recreation opportunities, (F) preserve historic sites, or (G) promote orderly urban or suburban development.
- **Option to Purchase at Agriculture Value (“OPAV”)** – is a voluntary legal agreement that restricts the sale of land to only certain farmers or to family members, and restricts the sale price to agricultural value (versus the higher fair market value). An OPAV is placed when the landowner sells or donates an OPAV to a land trust or government agency. Once land has an OPAV, its value is usually lowered (because the land is no longer able to be sold to all willing buyers and must be sold for agricultural value). This decreased value can make land with an OPAV more affordable for buyers, including farmers who may want to purchase the land.
- **Prime Farmland** – based on Natural Resources Conservation Service (“NRCS”) criteria, “prime” farmland is land with soils that have the best combination of physical and chemical characteristics for producing crops.
- **Purchase of Development Rights (“PDR”)** – also referred to as the Purchase of an Agricultural Conservation Easement (“PACE”) in other states, PDR is process by which an entity, usually a town or state government, purchase the development rights from a willing landowner, restricting future use of the land. Typically a conservation easement restricts residential and non-farm commercial development of the property in perpetuity, while allowing continued use of the land for farming. The landowner retains ownership of the land and may sell it or pass land on to heirs. The current, and all future owners, must abide by the terms of the easement. Easements are held by state, local government, and/or land conservation organization, and the entity that holds the easement is responsible for ensuring that the terms of the easement are upheld. Land under an agricultural conservation easement may be permanently assessed at its use value.
- **Resilience** – means the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from deliberate attacks, accidents or naturally occurring

⁶² https://www.cga.ct.gov/current/pub/chap_203.htm#sec_12-107b

threats or incidents, including, but not limited to, threats or incidents associated with the impacts of climate change.

- **Vulnerable Communities** – means populations that may be disproportionately impacted by the effects of climate change, including, but not limited to, (1) low and moderate income communities, (2) environmental justice communities pursuant to section 22a-20a, (3) communities eligible for community reinvestment pursuant to section 36a-30 and the Community Reinvestment Act of 1977, 12 USC 2901 et seq., as amended from time to time, (4) populations with increased risk and limited means to adapt to the effects of climate change, or (5) as further defined by the Department of Energy and Environmental Protection in consultation with community representatives.
- **Working Lands Easement** – help private and tribal landowners, land trusts, and other entities such as state and local governments protect croplands and grasslands on working farms and ranches by limiting non-agricultural uses of the land through conservation easements.



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