Growing a Climate Resilient New Hampshire Food System

OPPORTUNITIES FOR ACTION

PROPOSED BY

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Executive Summary

CENTERING CLIMATE CHANGE IN THE NH FOOD SYSTEM

A climate resilient food system is defined as one that, in the face of climate disruption, is reliable across the supply chain from production to distribution, ensures adequate food availability and access for all populations, and is centered on racial equity.

To foster the development of a climate resilient food system in New Hampshire, it is recommended that considerations of

1. Climate mitigation and resilience be integrated into food system planning and policy development; and
2. Food system considerations be integrated within and across all elements of state and regional planning and implementation.

These recommendations can be applied across all elements of the food system, including the following:

Diversity, Equity, and Inclusion
Food Production
Distribution and Sales
Food Access
Market Development and Consumer Education
Farmland and Fisheries Conservation and Access

Within each element, there is evidence of progress underway, but additional gaps and opportunities remain to develop a resilient food system. These can be addressed through a variety of policies and programs, but coordinated planning, investment and implementation by state, regional, and local entities is crucial to assure the most effective and lasting outcomes. As climate change impacts will grow and change in the decades to come, so too must the level of planning and engagement.

As climate change will affect all aspects of the environment, society, and economy; and as a viable, equitable food system supports the strength and well-being of society and the economy, we must ensure that these recommendations prepare New Hampshire for the decades ahead. By investing in a climate resilient food system in the near term, New Hampshire will be better prepared for future disruptions to global and regional food supplies, ensuring that our communities are thriving and food secure. It is anticipated that climate change preparedness will help protect our food supply and give New Hampshire a competitive advantage, attracting companies seeking more resilient and prepared locations.

1. Introduction

DEVELOPING THE CLIMATE RESILIENT FOOD SYSTEM TEAM

The NH Food Alliance (NHFA) convened a work group in 2019 to consider how climate change should be addressed within the local, state, and regional food system. After several months of deliberation, the work group developed a Climate Policy Brief. The brief did not include specific targeted recommendations for addressing climate change causes and impacts, but instead proposed a set of Recommended Actions that should be taken to develop coordinated and comprehensive climate resilient food system strategy.

Actions

1. Evaluate the resilience of the current food system in New Hampshire,
2. Learn from and coordinate with other states and regions working to build a climate resilient food system,
3. Conduct a comprehensive assessment of the current and projected impacts of climate change on New Hampshire's food system,
4. Consider the potential impacts of climate change in food producing regions outside of New Hampshire and identify the threats to New Hampshire's broader food system,
5. Develop an action plan or strategy to create a resilient food system in New Hampshire and identify entities and coalitions responsible for each element of the plan, and
6. Ensure that there is a viable coordinating entity.

The work group continues today as the Climate Resilient Food System Team to support the implementation of these recommendations. In Summer 2020, the NHFA hosted a Sustainability Fellow through the UNH Sustainability Fellows Program to explore Recommended Action 1. The Fellow embarked on a listening tour with 30 food system partners from across the state, including farmers, distributors, assistance providers, educators, non-profits, and others. The Fellow also collected information from 52 survey respondents.

The information gathered was used to identify the network of individuals and organizations involved in climate resilience in the New Hampshire food system, and learn what more could be done. This report summarizes key findings and opportunities for action based on the Fellow's work. It is not intended to be a detailed roadmap for building a resilient food network, but rather provides a significant contribution to addressing the Recommended Actions identified in the Climate Policy Brief. It is meant to lay an informational foundation for discussion among the NHFA partners and others interested in determining where to focus our collective energy to address climate resilience needs. Additional research and conversations with a wider circle of people in the New Hampshire Food System will improve the strength and accuracy of these findings.

2. Methods

Most information for this report was collected from conversations with 29 key food system partners via video call, phone, or email. Participants were identified based on NHFA partner recommendations and participant recommendation of peers, and were limited by participant interest and availability. Participants were also selected to ensure a broader level of representation from around the state and across sectors. Conversations were guided by a set of common questions and sector-specific questions tailored to five subgroups of participants. The intent was to prompt a constructive critique of the food system's climate resilience, highlighting success stories and existing resilience capacities, as well as vulnerabilities and opportunities for improvement. Questions were informed by a review of scientific literature on measuring and assessing the climate resilience of food systems.

Notes were taken during each conversion. Following the interviews, the notes were organized, and references to relevant programs and organizations were recorded as an "inventory" that documented the climate resilience efforts in place throughout the New Hampshire food system. While reviewing notes, themes were identified and their relevance to the overall narrative offered by each participant. Follow-up questions were also developed.

Each interviewee was offered the chance to review the conversation notes to ensure factual accuracy and answer follow-up questions. Edits and additions offered by the interviewees were reconciled with the existing notes to finalize the record for each conversation. All notes were compiled in one spreadsheet for better trend analysis of and determination of the overall key takeaways and findings. For interviews conducted via email, the written questions were sent to participants, who then answered and returned responses via email. The process was identical for all participants.

A survey including three questions was sent to a diverse group of stakeholders identified during the in-person interview process, and resulted in 47 completed responses. An updated survey of six questions was distributed to conservation districts through the New Hampshire Association of Conservation Districts and some town agriculture commissions through a Listserv of past and present members and interested parties. This second survey resulted in an additional five responses.

3. Findings

"People assume a strong economy and climate resilience are mutually exclusive. They are not. That is reductionist thinking. If we looked at this challenge as an opportunity and holistically, we would come to some resolution." Julie Davenson, Stonewall Farm

3.1 CREATING A CLIMATE RESILIENT FOOD SYSTEM

A climate resilient food system requires conserving resources for food production and making those resources accessible. It involves expanding markets for local food and inspiring consumer engagement. It also includes planning for a climate resilient future, and dismantling social and economic oppression to ensure that all people have equal access to healthy food and opportunities to participate in the food system. Some strategies for addressing food system disruptions are specific to climate change. Others are not, but contribute to the foundation of resilient, sustainable, and just food systems and communities all the same.

RECOMMENDATIONS

To achieve this outcome in New Hampshire, two complementary, high-level recommendations were identified.

1. Integrate considerations of climate mitigation and resilience with food system planning and policy development; and
2. Integrate food system considerations within and across all elements of state and regional planning and implementation.

These recommendations can be applied across the entire food system (See Figure 1), whether at the point of production, farms, and fisheries; or at distribution and sales. Climate change will affect all aspects of the environment, society, and the economy. A viable, equitable food system supports the strength and well-being of society and the economy. Implementation of these recommendations will help to ensure New Hampshire is well prepared for the decades ahead.

An important consideration within each recommendation, is to build climate change and food system planning into existing networks and organizations, rather than building new institutions. Developing knowledge, and skills, as well as interconnections among existing programs and practitioners will speed the development of a more resilience food system.

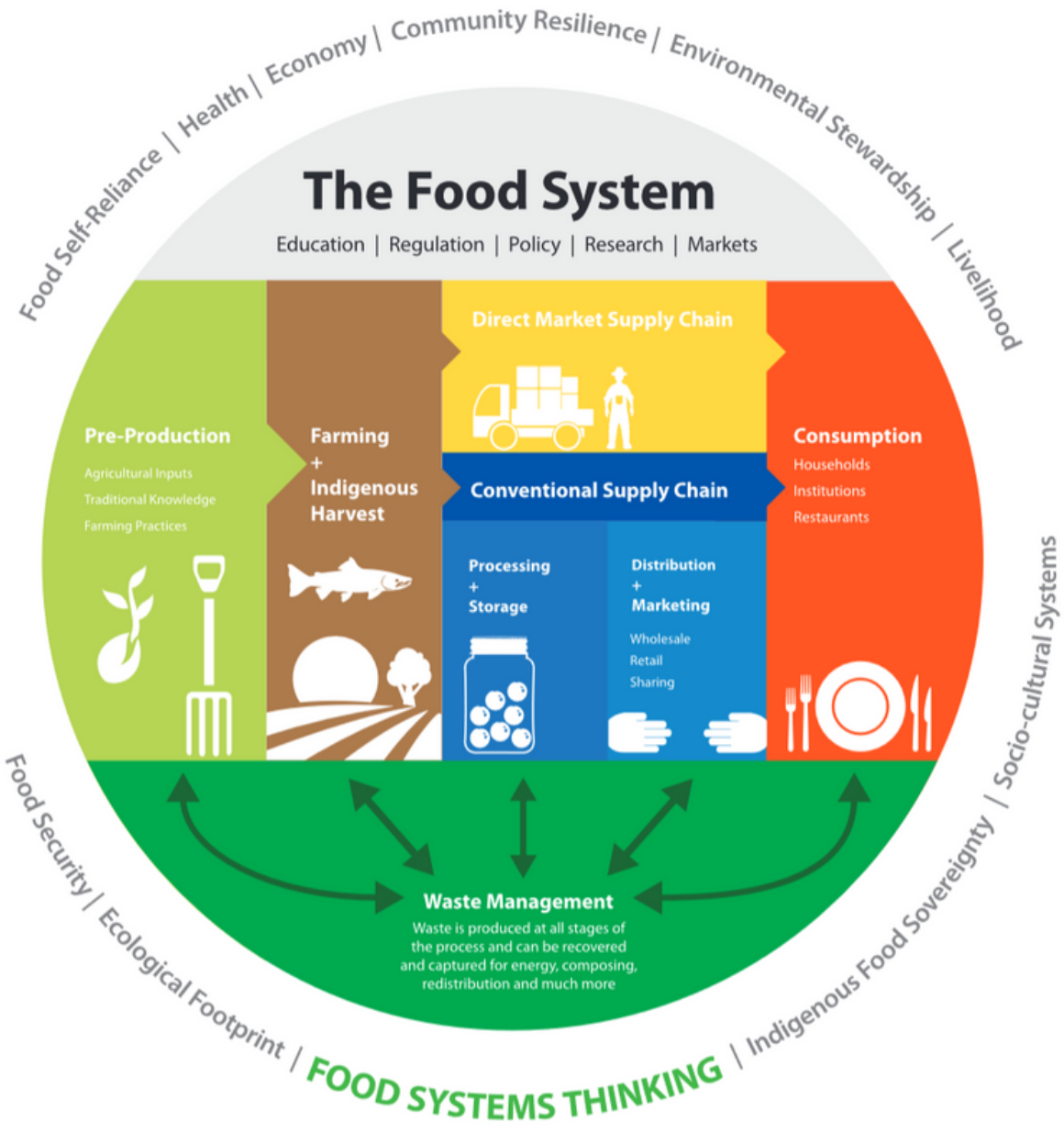

Figure 1. The food system includes all processes and infrastructure involved in feeding a population and includes the following key elements: pre-production, farming and wild harvest, processing and storage, distribution and marketing, consumption and waste management. Climate change affects all elements of the food system.

Source: https://sfb.nathanpachal.com/2015/08/kpu-researcher-studying-future-of-food.html

The response to climate change will vary across the food system and within entities and organizations involved in planning and response. For example, food production can be affected directly by both recurring persistent climate stresses such as increasing annual temperatures, as well as disruptive shocks like extreme storms and droughts. In contrast, the food distribution and food access elements of the food system may be less exposed to the persistent stresses, while remaining vulnerable to disruptive climate shocks. In preparing for and responding to climate change, each element of the food system will need to be addressed in a unique way, while still keeping an eye on connections across the entire system.

3.2 OPPORTUNITIES FOR ACTION

The following sections provide an assessment of the current state of climate resilience efforts in New Hampshire, noting the actors, success stories, and need for further action. While the majority of this report focused on resilience, climate mitigation remains a critical consideration across all efforts.

3.2.1 Food Production

A climate resilient food supply requires a strong community of viable local farm and fishing businesses, growing and catching food using methods that can accommodate climate impacts. This is best supported by a strong and responsive support network of researchers, technical advisors, and accessible financing entities.

Key Partners

- Farmers, growers and fishers
- County Conservation Districts
- Natural Resource Conservation Service New Hampshire (NRCS NH)
- Northeast Organic Farming Association of New Hampshire (NOFA-NH)
- NH Farm Bureau
- NH Food Alliance
- NH Department of Agriculture, Markets, and Food
- NH Sea Grant
- UNH Cooperative Extension and Ag Research Station
- US Department of Agriculture (USDA) Climate Hub
- Vital Communities
- Other localized producer support organizations
- Land for Good
- Local land trusts
- Grant-making and finance organizations

Food Production Success Stories

Most farmers are adapting to increasingly variable weather and other climate impacts, as well as economic pressures, as they try to maintain successful businesses. This is likely a result of the fact that constant adaptation comes with the profession. However, food producers and assistance providers note weather and soil moisture variability have increased significantly in recent years. Accommodating this variation and other changes while producing more of the state's food will require coordination and cooperation. Fortunately, there are technical and financial support systems in place to aid climate resilient food production at the local (e.g., UNH Cooperative Extension, NRCS NH, county conservation districts), regional (e.g., National Center for Appropriate Technology, UNH Cooperative Extension Research), and federal levels (e.g., USDA Northeast Climate Hub).

- The UNH Cooperative Extension is working to learn and share new techniques for managing observed changes through their networks.
- NRCS NH and many conservation districts are supporting farm transitions to resilient practices like no-till and cover cropping through financial and technical assistance and equipment rental.
- NOFA-NH is currently offering Collaborative Regional Alliance for Farm Training (CRAFT) peer to peer farmer training programs. Six on-line farm tours for both growers and interested eaters were presented through October 2020.
- The Climate Adaptation Fellowship, developed by the University of Vermont, the University of Maine, Rutgers University and others, provides farmers, foresters, and advisors with the information they need to adapt to climate change.

"(The main) challenge is getting the fishing industry to acknowledge the real threat that is climate change and participate in their own resilience... I have seen that (adaption) is possible especially in the face of the current pandemic, but that was an immediate and tangible threat." -Dr. Gabriela

Gaps & Opportunities

Most funding for climate resilient land management and infrastructure changes is restricted to federal NRCS NH programs, primarily the Environmental Quality Incentives Program (EQIP). These programs are helpful, but may have onerous project requirements that can be logistically complex and encourage overbuilt solutions. This could be addressed by transitioning to more flexible financial and technical assistance, perhaps administered locally, to smaller, diversified producers, who are not well served by national programs. This would likely require changes at the federal level.

Most funding and assistance opportunities highlight building healthy soil as the critical adaptation strategy, glossing over other important adaptation activities. Water and pest management, season extension and others are important adaptation strategies for many producers. Financial and technical assistance for these activities could be improved.

Producer-to-producer and producer-to-assistance provider networks for learning and research could be strengthened and better connected. Producers' most trusted information sources are each other. Many expressed interest in stronger, more formal networks for sharing new ideas and techniques. Organizations like the Small and Beginning Farmers of New Hampshire and Vital Communities' Farmer Climate Network are examples.

Producers are more likely to attempt and succeed with adaptation strategies when supported by assistance providers. If successful, they become the best ambassadors for these novel techniques. The UNH Cooperative Extension, NRCS NH, and county conservation districts do their best to disseminate information, and the Climate Adaptation Fellowship program mentioned above is getting started. Yet farmers still report that more assistance staff, research, and resources for adaptation would help them to become more climate resilient.

While many farmers are adapting, many in the fishing community are not. Fishing communities face steep financial access barriers, market volatility, and feel increasingly regulated by the government. Meanwhile warming and acidifying waters degrade habitat and shift ranges of their target species. Facing these pressures, many in the aging fishing industry reduce landings or simply stop fishing rather than adapting to fish for different species (which could be a costly transition) or turning to aquaculture or other ventures (which are potentially costly and could entail a very different way of life).

There are mixed opinions on whether the region needs more shared facilities for processing and making value-added products. Some existing facilities aren't at capacity. More light-processing and storage infrastructure could be helpful, though depending on the equipment producers might prefer self-ownership to communal operations.

3.2.2 Distribution and Sales

Diverse and adaptable distribution ensures a reliable food supply. Distribution channels are the veins and nerves of a climate resilient food system. A diversity of local, regional, and national supply chains protect supply reliability should climate impacts destroy crops or disrupt transportation. Rebuilding the regional link in particular requires collaboration to define business models that are logistically and financially feasible.

Key Partners

- Financiers
- Food cooperatives
- Food hubs (New Hampshire Food Hub Network researchers and coordinators)
- Associated Grocers
- UNH Cooperative Extension
- NH Department of Agriculture, Markets, and Food
- Local retail stores and regional/national chains
- Producers and processors and distributors (local and national)
- Property and real estate owners

Resilience Success Stories

Consumer interest in local food was higher in 2020 than any time in recent history. The dramatic increase of Community Supported Agriculture/Farms (CSA/CSFs), farm stand sales and other direct marketing avenues in early 2020 highlighted 1) the strength of social networks among producers to maximize food moving through these channels; and 2) the willingness and eagerness within a subsection of eaters to interact with their food differently, more locally, and more intentionally.

Food hubs are beginning to network within New Hampshire and up and down the east coast to expand markets for local food, diversify product lines, offset seasonality, and smooth market fluctuations. This allows them to compete better with national food distributors, carry more retail accounts, and in the end offer a larger and more diverse market for local producers. It also allows them to carry products that have become harder to grow locally due to climate shifts (e.g., cool weather crops).

Food Hub network-building is "not competition, it's more a form of cooperation. These place-based businesses tend to have defined territories, so there's less room to compete for customers. Meanwhile significant financial and logistical efficiencies can be achieved through stronger communication and sharing resources, ideas and products between hubs." - Richard Berkfield, Executive Director of Food Connects

Gaps & Opportunities

Partners have a chance to capitalize on increased consumer interest in (or at least awareness of) local food before it is forgotten. In Spring of 2020, local food hubs and distributors saw an enormous increase in demand for the local products they aggregate amid shortages in national supply chains. These distributors and their buyers have tested the capacity of local and regional distribution and seen what works. Now could be a good time to capitalize on this newfound interest. Direct-to-consumer sales via farm stands, CSAs, and other methods also increased dramatically. These consumers proved eager to interact with the local food system directly.

Food hubs and food hub networks could be expanded and efficiencies increased by addressing physical infrastructure needs, and improving communication. This could include:

- Enabling more responsive communication horizontally between hubs and vertically between producers. Distributors and retailers could help coordinate supply and demand, which could result in coordinated crop planning to allow staggered harvest and processing times and allow distributors to anticipate supply through forward contracts or other strategies.
- Support more integrated communication networks across hub boundaries to move products and ideas, perhaps through an inter-hub working group, communication platform, or shared staff.

3.2.3 Food Access

A climate resilient food system ensures everyone has a secure food supply, especially during disruptions, and aims to close the gap between fair value for producers and affordable value for consumers. This gap and the potential for access disruptions are larger in low-income communities, and climate resilience strategies are linked to public health, nutrition, and social and economic equity efforts.

Key Partners

- Distributors and food hubs
- Economic and community development organizations
- Food banks and emergency food access organizations
- Food production, nutrition, and food systems educators
- New England State Food System Planners Partnership
- Public health organizations
- Public & private institutions like schools & hospitals
- Food Solutions New England
- NH Department of Agriculture, Markets, and Food and other governmental food assistance programs

Resilience Success Stories

Organizations adapted to stabilize food access during supply chain disruptions in spring 2020. The NH Feeding NH program recently launched as a collaboration between the New Hampshire Food Bank, Northeast Organic Farming Association, New Hampshire Farm Bureau, and NHFA. The New Hampshire Food Bank used CARES Act funding to allow food pantries around the state to purchase produce, dairy, and proteins from participating New Hampshire farms and food businesses.

Partnerships between public health and food system advocates have been successful in supporting food access. Sufficient access to affordable, culturally appropriate, healthy food is a key social determinant of public health. Partnerships between hospitals and communities to improve food access (e.g., Partners in Community Wellness), as well as public health organizations and food system advocates (e.g., NH Public Health Association and NH Food Alliance Food Access Coalition) are examples of bringing these groups together to have a greater impact

Gaps & Opportunities

Continue advertising to increase awareness and use of the Granite State Market Match program. Many interviewees lamented that use of this program by both consumers and retailers was lower than they hoped, though it does seem to be increasing.

Continue to strengthen partnerships between food access, distribution, and public health communities. These organizations share the goal of ensuring everyone eats healthy food. Collaboration on research, communication, funding and program integration could increase efficiency and strengthen social support networks for crisis response.

Increase integration of food banks and food assistance organizations into the New Hampshire wholesale distribution network. This might give these organizations and low income residents more affordable access to healthy local food. A related task is ensuring a reliable food supply for food access programs targeting people who don't or can't drive (e.g., meal delivery programs for seniors).

Food assistance programs are a band aid and don't address the root cause of food insecurity. Expanding partnerships with affordable housing programs and organizations working to ensure fair wages will be an important part of solving food insecurity.

3.2.4 Market Development and Consumer Education

To maintain a climate resilient local food system, consumers must demand it. Creating avenues for farmers to sell more local food (increasing supply) and engaging eaters to invest in this kind of food (increasing demand) go hand in hand. This category exists to acknowledge the critical power that eaters have in shaping food systems. Yet climate resilience efforts and strategies here are closely tied to those elsewhere. Market development is tightly linked to distribution efforts. Consumer education is most helpful alongside food access and equity efforts that enable widespread participation in the local food system.

Key Partners

- NHFA Communications Team
- Local Food Promotion Programs (NH Eats Local and localized “eat local” programs)
- Food Solutions New England and other regional food communication organizations
- Farm-to-institution organizations
- NH Department of Agriculture, Markets, and Food
- UNH Cooperative Extension
- NH Departments of Education and Health and Human Services
- Public health and nutrition education organizations
- NH Farm to School

Resilience Success Stories

There are several community-based and statewide “eat local” consumer education campaigns connecting Granite Staters to their neighborhood farm and food businesses. These include the NH Eats Local campaign, as well as other regional campaigns in the Seacoast, Merrimack, Monadnock, Mount Washington Valley, and many other locations. Several of these place-based organizations compile guides and interactive maps for this purpose; UNH Cooperative Extension compiles this information at a state level in their Local Farm Products and Local Seafood Finder maps.

We understand why some New Englanders choose to buy local food. For example, according to UNH research, the most common reasons consumers think buying local is “very important” are to preserve local farmland, support the local economy, and purchase food free from pesticides. (For more information, see the Helpful Resources section below).

Gaps & Opportunities

Promote the inclusion of messaging about the value of climate resilient local food systems in “eat local” communications.

Support the integration of food and climate literacy education into mainstream learning opportunities.

Continue to support more formal “match-making” efforts to connect producers to distributors, wholesalers and retailers to expand markets for local food.

3.2.5 Farmland and Fisheries Conservation and Access

No farms, no fish, no food. New Hampshire cannot reach a level of self-sufficiency needed to be resilient in a food supply crisis - climate induced or otherwise - without preserving enough productive and financially accessible farmland and fishing stocks. Investing in climate resilience is one more reason to conserve land and sea resources and lower barriers to regenerative use of them.

Key Partners

- Conservation districts
- Farmers, growers, and fishers
- Farm land conservation organizations
- Fisheries conservation and access organizations
- Land owners
- Land trusts of all sizes
- Open space preservation organizations

Resilience Success Stories

Existing efforts and tools to preserve productive farmland in New Hampshire are significant. For example, New Hampshire current use taxation laws are forward thinking, and legal instruments like the "option to purchase (land) at agricultural value" are useful in preserving fair-priced farmland. The Agrarian Trust, Land For Good, and many local organizations are making creative use of these and other strategies to keep land affordable and farmers on it.

Meanwhile, the NH Farm Future Fund provides grant funding to New Hampshire land trusts to work with New Hampshire farmers to preserve prime agricultural land and connects those farmers with business planning expertise, supporting land preservation and farm viability simultaneously.

Gaps & Opportunities

Support could be rallied behind key policy ideas drafted by the NHFA Land Resources Action Team (See policy matrix in the annotated bibliography below)

There is much potential for appropriate development of renewable energy generation on farmland to provide clean power and another revenue stream for farm land-owners and mitigates climate impacts. For example, Cheshire County Conservation District recently partnered with ReVision Energy to install a 100kW solar array on a host farm.

Under a power purchase agreement, that clean electricity will be sold to power participating farm businesses at a low, fixed rate. This pioneering project could lead the way for others.

More work is needed to lower access barriers to sustainable fisheries. Financial barriers for new fishers, including equipment costs and the price of quota for some species are steep, especially given volatile market prices for many key species.

The result has been a "greying of the fleet," as these and other regulatory and environmental factors discourage young and diverse fishers from entering the industry. More resources and attention from partners and decision-makers are needed to address the long-term viability of a sustainable fishing economy.

3.2.6 Diversity, Equity, and Inclusion

Ideally everyone who wishes to do so, will have the opportunity to farm, fish, and eat, despite the impacts of climate change. All racial, social, and economic equity work is foundational to the realization of a food system that is truly resilient to climate change or other disruptions, which tend to exacerbate long-standing inequities. This cross-cutting issue affects all areas of climate resilience work.

Key Partners

- Endowment for Health Equity in New Hampshire
- Fresh Start Farms
- NHFA Equity Team
- Governor's Council on COVID and Equity
- Organization for Refugee and Immigrant Success
- Welcoming New Hampshire
- All policy and planning stakeholders
- All food access stakeholders
- All land access stakeholders

Resilience Success Stories

There are some examples of successful synergy in developing a climate resilient and equitable food system at the same time, showing that climate resilience work can promote equity and vice versa.

One example is the COVID and Equity Task Force, coordinated by the NH Public Health Association and Department of Health and Human Services. This group brings together organizations, agencies, and advocates dedicated to ensuring an equitable response to COVID relief for historically marginalized and minority populations in New Hampshire. Members of this team have written initial recommendations and guidelines for promoting equity in the COVID response, including in areas of food security and access.

Gaps & Opportunities

The homogeneity of the New Hampshire farming community stifles the potential of New Hampshire food production, but is fixable. Farm and landowners are disproportionately white, male, and older. Access to capital and land is much easier for those with financial means or family-owned land. Cultural influence and economic barriers perpetuate this and keep many women, non-white, and less wealthy Granite Staters from contributing their ingenuity and energy to the New Hampshire food system. Breaking this cycle involves lowering access barriers to farmland, fisheries resources, and assistance programs, as well as farm and food education so a broader audience can make informed choices about pursuing a career in food production.

The HEAL Food Alliance and Union of Concerned Scientists report “Leveling the Fields - Opportunities for Black People, Indigenous People, and Other People of Color” details many policy-centric strategies to address these inequities, including strategies for incentivizing Black, Indigenous, People of Color (BIPOC) land ownership, offering legal aid for land acquisition, and restructuring technical and financial assistance programs to meet BIPOC farmer needs

There are fundamental inequities in access to food that are unjust and detrimental to public health. Traditionally marginalized communities are less likely to have access to local food and produce. Food access, nutrition, education, and public health efforts should note this.

There is geographic and economic disparity in who can participate in the local food system. This applies to accessing food as well as the means of food production, and addressing it revolves on promoting sustainable economic development and equality throughout New Hampshire.

"One success story is Morningstar Market in Concord, (where) Fresh Start Farmers sell their African eggplant, African corn, Amaranth, Nepali crops, and many other hard-to-find items... Residents can take advantage of the Granite State Market Match as well, making the food affordable. It's a win-win-win." -
Laurel Witri, Organiation for Refugee and Immigrant Success

3.2.7 Climate Mitigation

The work of addressing climate change is often split into mitigation—reducing the causes of climate change (e.g., eliminating or sequestering greenhouse gas emissions), and resilience adaptation—measures aimed at softening climate impacts that are already unavoidable. This research focused on resilience, but further research on mitigation efforts in the New Hampshire food system and opportunities to expand them would be worthwhile.

Examples include the following:

Building Soil Health. Many farmers, researchers, and technical advisors are taking actions that sequester carbon, but that may not be their primary goal. Most of this incidental mitigation happens via programs offered by county conservation districts, NRCS, and others that promote building soil organic matter and fertility for various reasons (e.g., increasing yield, water retention, erosion control via cover crops, etc.). Some private companies and NGOs are researching techniques for measuring and improving soil carbon sequestration particularly on pastureland, notably the OpenTEAM project whose local leads include Stonyfield Organics and Wolfe's Neck Center. Currently, there are no public state or local programs that incentivize carbon sequestration via land management.

Expanding and streamlining local food markets. Further up the supply chain, expanding and streamlining regional food distribution to reduce overall food transport miles cut costs and can sometimes reduce emissions. "Eat local" education campaigns and other efforts to grow consumer demand and markets local food can also help.

Reducing food waste. Any food diverted from the waste stream to people, animals or compost reduces landfill emissions and demand for further food production, and can contribute to food access, farm viability, and soil fertility. Of 52 survey respondents, 24 said they contributed to climate action "by getting excess or "wasted" food to food insecure populations." The nature and impact of these activities requires further research.

Enabling renewable energy development. Some farms, in order to offset their own energy use and diversify their income streams, have installed solar photovoltaic systems themselves or leased their land to a private energy company. While this is not without controversy, numerous resources, including one by the Maine-based environmental and agricultural organizations, outlines best practices to avoid and/or minimize impacts to wildlife, farming, and critical natural resources from solar development. This strategy increases clean, renewable energy production while maintaining (or allowing in some cases) agricultural production.

There is also interest in carbon markets: The idea of paying land managers for the service of sequestering carbon. However, many feel that New Hampshire farms, because of their small number and acreage, may not be suited for programs like this. Depending on the monetary value of sequestered carbon and rules for what actions count towards sequestration, participation might be worthwhile only for the largest landowners, like big dairy farms. Any national carbon market would likely be shaped by and for farming communities from other regions that have larger farms and political sway. A state- or region-wide market fit for smaller landowners seems unlikely, since the value of carbon credits sold would still need to be competitively low. The potential for sequestration activity on active farmland is lower in New Hampshire compared to other regions of the country such as the Midwest. Given this reality, market incentives may not drive carbon sequestration practices on New Hampshire farms.

3.3 IMPLEMENTATION: PLANNING AND POLICY INTEGRATION

Doing this work well, requires cohesive strategy and forethought. While strong grassroots organization is key to climate resilient food systems and communities, improvements happen more swiftly and consistently with guidance from the top. If planners and decision-makers at the local, regional, and state levels prioritize support for a robust local food economy and a reliable food supply for all, it would invigorate climate resilience efforts across the state food system.

Key Partners

- NH Department of Agriculture, Markets, and Food
- NH Departments of Environmental Services
- Food advocacy organizations
- Hazard mitigation/risk management organizations
- Municipalities and regional planning offices
- Regional adaptation working groups (Coastal and Upper Valley)
- Climate and environmental advocacy organizations
- UNH Cooperative Extension
- New England State Food System Planners Partnership
- Voters and legislators

"Think how much we spend as a nation on military defense or disease prevention. A safe and sustainable food supply is equally important to our survival." - Jeremy Lougee, Southeast Land Trust of New Hampshire

Resilience Success Stories

Several work groups or "communities of practice" for climate resilience planning already exist in some New Hampshire communities, supported by municipalities, regional planning commissions, non-governmental organizations, and state agencies. These structures provide space to begin discussions of food system resilience in a climate context and offer models that can be replicated and adjusted for other communities. The New England State Food System Planners Partnership provides this support at the regional scale.

Food and climate advocacy groups are collaborating to inclusively describe and lobby for a climate resilient food system at the New England level, which broadens resource and communication networks for New Hampshire efforts.

The "Healthy Soils Bill" of 2020 (HB 1562) was unsuccessful, but precedent setting, in that it explicitly introduced the issue of climate change in relation to agriculture, raising the level of conversation concerning this issue in New Hampshire politics.

Gaps & Opportunities

There is a gap in statewide leadership when it comes to incentivizing and planning for a climate resilient food system. State government is not very focused on climate impacts to food production and supply, and relevant departments currently lack the resources to invest further funding and staff time in this issue.

Over the course of the research period, there was a common theme across interviews, they stated, *"strategizing to build a climate resilient food system isn't really in my job description, but I find a way to work on it because it's important."*

There is great potential to center planning for climate resilient food systems in other ongoing planning activities:

The hazard mitigation/resilience planning community is very interested in inviting food system stakeholders to their conversations. Currently these groups focus more on addressing the climate impacts to natural and built landscapes (especially sea level rise), but the pandemic piqued interest in addressing the vulnerability of New Hampshire's food supply in any crisis. NHDES' Adaptation Program and regional working groups are key stakeholders in this work.

Few municipalities and regional planning commissions are considering climate impacts to food systems and taking actions but interest is rising. An exemplary effort is the Durham Agricultural Commission's efforts to educate voters and officials to support ag-friendly zoning in urban areas and consider agriculture in master planning. More stakeholder-education work could be done to encourage other town planning boards to pass similar ordinances. Similar efforts could encourage Regional Planning Commissions (RPCs) to understand the nexus between food systems and climate resilience.

Programs like the Upper Valley Adaptation Workgroup/Vital Communities' Climate Change Leadership Academy can empower community leaders to organize local climate resilience efforts.

There is broad, but vague, support for "policy change" in the local food community. Public interest exceeds current opportunities for engagement, but there is no clear community organizing leadership or consensus on issue prioritization.

4. Conclusion

Climate change will affect all aspects of the environment, society, and the economy. We know that a viable, equitable food system supports the strength and well-being of our communities and their economies. The recommendations in this report can help New Hampshire prepare for the impacts of climate change in decades ahead. By investing in a climate resilient food system in the near term, New Hampshire will be better prepared for future disruptions to global and regional food supplies, whether climate change related or related to other significant social or economic disruption. It is also anticipated that preparing the food system to be climate resilient would not only enable the state to secure its food supply, but it could also give New Hampshire a competitive advantage, making the state more attractive to companies looking to establish new facilities or even relocate away from areas experiencing greater impacts.

Building such a climate resilient food system will require a deliberate and strategic undertaking to address the gaps and opportunities identified in this report, building off the work laid out in the 2020 Climate Policy Brief. The NHFA has already convened a Climate Resilient Food System Team (CRFST) to help guide this work. The CRFST may engage a small advisory team to manage the big picture planning as well as convene smaller action-oriented subgroups as needed to advance short to medium term projects.

Potential next steps for the CRFST could include:

1. Working with partners in New Hampshire and across the region to develop:
    a. An assessment of how the various impacts of climate change and fossil fuel consumption may affect food production on land (e.g., changes in winter temps and precipitation, increased frequency and severity of drought) and in the ocean (e.g., acidification, increasing temperature). This could include impacts to food production, and along the supply chain through distribution and retail.
    b. An evaluation of other impacts and issues that should be considered to holistically address food security/availability opportunities and challenges, including those related to geography, socioeconomic status, and equity.
    c. A list of other considerations such as demand for organic production, access to land, and funding.
2. Developing a set of strategies to address the identified issues and impacts, both climate change and others, that include:
    a. Potential state and federal policy measures, such as new laws or funding;
    b. Planning; and
    c. Education and technical assistance, in the form of common messaging and guidance.
3. Develop a "climate change and food systems lens" through which the NH Food Alliance network partners do food systems work, and collaborate with climate focused organizations to integrate food system concepts into their work.
    a. Integrate climate mitigation and resilience language into food system planning (e.g., at the food bank, with technical assistance providers, in public health sector) and policy development (both legislative and non-legislative).
    b. Integrate food system considerations within and across all elements of state and regional planning and implementation (both legislative and non-legislative).

The development of the above assessments and evaluations as well as the strategies to make the food system become more resilient would draw from the findings in this report. This includes both the well understood opportunities and gaps, as well as the additional questions raised during and as a result of this report. Because climate change has causes and impacts that occur all throughout society and our economy, development of effective solutions and strategies will best be done with a broad consideration of the interconnected elements.

Finally, these strategies would not be the responsibility of the NHFA alone to implement. Instead, they would best be accomplished by those entities within the state that are already set up to complete similar work. The strategies could be divided among the NHFA partner sectors to minimize duplicative work. For instance, land trusts could be help work to protect prime agricultural lands, while RPCs could include food security broadly across the chapters of a municipal master plans, and climate change practitioners could include concept of food system resilience into their lexicon. As food determines the very wellbeing of our community and society, it can become part of the foundation of everyone's work.

APPENDICES

Appendix I: Annotated Bibliography

Measuring Climate Resilience in Food Systems Brief

- This document contains 1) a shortlist of the most applicable frameworks for assessing food system climate resilience for our context, based on literature review, 2) what these frameworks have to say about choosing indicators for measuring resilience, 3) definitions and themes of "food security" and "resilience" across the literature, and 4) example policies for (climate) resilient food systems provided in the literature.
- Planning and Policy

Report of the New England Adaptation Survey for Vegetable and Fruit Growers

- This report shares findings on 1) what climate impacts growers are most concerned about, 2) how they are adapting, 3) popular information sources for learning new techniques, and 4) what resources would be most helpful to aid adaptation. This research, led by University of Vermont Research Specialist, Alissa White, influenced the creation of the Climate Adaptation Fellowship peer-learning program for producers and technical advisors.
- Food Production; Planning and Policy

The New Hampshire Food Hub Network SWOT Analysis

- This is a preliminary analysis of the strengths, weaknesses, opportunities, and threats to the development of a statewide network of food distribution hubs, developed by Gorhan Public Health Consulting with the support of NHFA, Kearsarge Food Hub, and others and with funding from the USDA. It also discusses initial opportunities for action.
- Market Development and Consumer Education, Food Access, Planning and Policy

Why Do (Or Don't) New Englanders Buy Local Produce?

- This is a brief report summarizing just that. Findings are based on survey research of consumers in NH, VT, and ME. Research was conducted and published by Samantha Werner of the UNH Department of Natural Resources and the Environment with assistance from Dr. John Halstead of the same department and Nada Haddad of UNH Cooperative Extension.
- Market Development and Consumer Education; Food Access

Appendix I: Annotated Bibliography

NHFA Land Resources Action Team Policy Matrix

- The matrix, as explained in the supporting policy brief, "highlights a suite of policy approaches aimed at securing and stewarding the agricultural land base in New Hampshire." These approaches are ranked "according to how complex and feasible each would be to implement. The matrix also includes how each approach would be implemented (mechanics), current associated rules and statutes, and further comments about each. This matrix can be used to inform policy planning and priority setting within organizations, networks, municipalities, and state agencies."
- Farmland Access; Planning and Policy; Diversity, Equity and Inclusion

The Healthy Food Policy Project

- The project is a collaboration of the Center for Agriculture and Food Systems at Vermont Law School, the Public Health Law Center, and the Rudd Center for Food Policy and Obesity at the University of Connecticut. They have compiled a database of local policy examples, webinars, and case studies that "promote access to healthy food while also contributing to strong local economies, an improved environment, and health equity, with a focus on socially disadvantaged and marginalized groups."
- Planning and Policy; Food Access; Diversity, Equity and Inclusion

Success Stories of Local Food Resilience in Vermont

- This storymap is maintained by the Vermont Farm to Plate Network. Included are replicable examples of public, private, and volunteer efforts to improve food access and strengthen the local food economy.
- Food Access; Planning and Policy; Diversity, Equity and Inclusion

Appendix II: Definitions of Key Terms

- **Food system—** Encompasses the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption, and disposal of food products that originate from agriculture, forestry, or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded.
  - Source: United Nations Food and Agriculture Organization (UNFAO) (2018)

- **Resilience—** "The ability to prevent disasters and crises as well as to anticipate, absorb, accommodate, or recover from them in a timely, efficient and sustainable manner"
  - Source: United Nations Food and Agriculture Organization (UNFAO) (2016)

- **Food security—** Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.
  - Source: 1996 World Food Summit

- **Sustainability—** The reconciliation of environmental, social and economic demands —the "three pillars" of sustainability— for the immediate and future well being of individuals and communities.
  - Source: The United Nations Environment Program

- **Local v. Regional—** For the purposes of this report, we define local food as food produced, harvested, or processed in New Hampshire; and regional food is food produced, harvested, or processed in New England, or the Hudson Valley, New York.

Appendix III: Interviewees, Interview & Survey Questions

Interviewees

The following organizations were interviewed for this report:

- League of Conservation Voters
- NH Department of Environmental Services
- 350NH
- Vital Communities
- Hanover Co-op Food Stores of NH & VT
- UNH Cooperative Extension
- Cheshire County Conservation District
- Food Connects
- Coos County Small and Beginner Farmers
- Seacoast Eats Local
- Southeastern Land Trust of NH
- UNH Department of Agriculture, Nutrition, and Food Systems
- NH Sea Grant Extension
- Northeast Organic Farming Association of NH (NOFA-NH)
- National Center for Appropriate Technology – Northeast Office
- New Hampshire Farm Bureau Federation
- New Hampshire Community Loan Fund
- University of Vermont
- New Hampshire NRCS
- Stonewall Farm
- Town of Durham Agricultural Commission
- Organization for Refugee and Immigrant Success (ORIS)
- USDA Northeast Climate Hub
- Middle Branch Farm
- NE Farmers Union
- Vermont Sustainable Jobs Fund
- Gorhan Public Health Consulting

Appendix III: Interviewees, Interview & Survey Questions

Interview Questions

The above organizations interviewed were asked the following questions:

1. Who is doing/enabling climate adaptation/resilience?
2. What's working?
3. Where is there room for improvement?
4. What resources are needed to make that improvement?

Survey Questions

The above organizations were provided the following survey questions:

1. What is the focus of your organization's work?
2. Does your organization directly address climate change?
3. What resources would make it possible for you to address climate resilience in your work?
4. What resources would make it possible for you to address climate resilience in your work?
5. What is the focus of your organization's work?