# Farming

## 1. Introduction

### Chapter Overview

This chapter provides a guiding framework for the future of agriculture in Hatfield and articulates key adaptation and resiliency actions for the Town of Hatfield to undertake in support of a more robust and regenerative local agricultural sector.

Hatfield is a small community that highly values its agricultural heritage and productive landscapes. While known for growing potatoes, Hatfield's farms also produce a wide range of agricultural products including dairy, vegetables, and nursery plants. A growing number of challenges, however, threaten the future viability of farming in Hatfield. A third of Hatfield's most productive farmland is within the 100-year flood plain of the Connecticut and Mill rivers, which flood more frequently now due to climate change. Some 500 acres of farmed fields are also in probable wetlands with a frequent tendency to flood. The vast majority of currently cultivated soils all show signs of degradation after centuries of regular disturbance. And approximately 80% of Hatfield's farmland remains unprotected from the threat of future development, vulnerable to rural sprawl and a permanent loss of productivity.

The landscape of agriculture in Hatfield has changed dramatically over the last half century. In addition to navigating broad economic, technological, and social changes, farms today are now facing major challenges around shifting seasons, heavier precipitation, prolonged droughts, and higher intensity storm systems due to climate change. Hatfield farmers report that the unpredictable climate is threatening already slim margins and further increasing the risks of being financially dependent on agriculture as a source of income. The last three years, 2021-2023, have been some of the most difficult farming years in recent history, and many producers talk about the toll uncertain farm futures is taking on their mental health.

Small family farms are the economic engine of agriculture in Massachusetts. According to the 2022 USDA Census of Agriculture, 69% of farms in the state are under 50 acres and 91% are under 180 acres. 80% have agricultural sales below $50,000 and 93% have agricultural sales below $250,000. The average age of a principal operator is 58.7 years old. Between 2017 and 2022, the total number of farms in the state decreased by 2.1% and the total amount of land in farms decreased by 5.5%. Hampshire County fared slightly better with a slight increase in both the number of farms and the amount of land in farming, with the most gains in farms under 10 acres. Total harvested cropland in the country decreased 3%, though the average value of agricultural products per farm increased 23%. Still, current trends indicate

that without careful planning, Hampshire County could still see the conversion of 3,700 acres of its best agricultural land by 2040.[1]

While just 4% of Massachusetts land is active farmland, agriculture and food processing contributes $1.3 billion in direct sales and $13.3 billion in total economic impact[2] and is a key driver of cultural identity, community resilience and environmental justice. At the same time, conventional food systems and land use contribute 24% of all anthropogenic greenhouse gas emissions, making it a key leverage point for municipalities to both reduce their carbon footprint and support local food security, economic growth and environmental resource conservation. And, land-based carbon sinks are the largest resource available for drawing down carbon emissions in the atmosphere (See Figure 1). As Hatfield and other small, agriculturally-inclined communities plan for the future, valuing the importance of healthy local farm ecosystems will help to drive innovation and bolster the local agricultural economy, while protecting the lasting rural character of the town.

## Connecting Themes

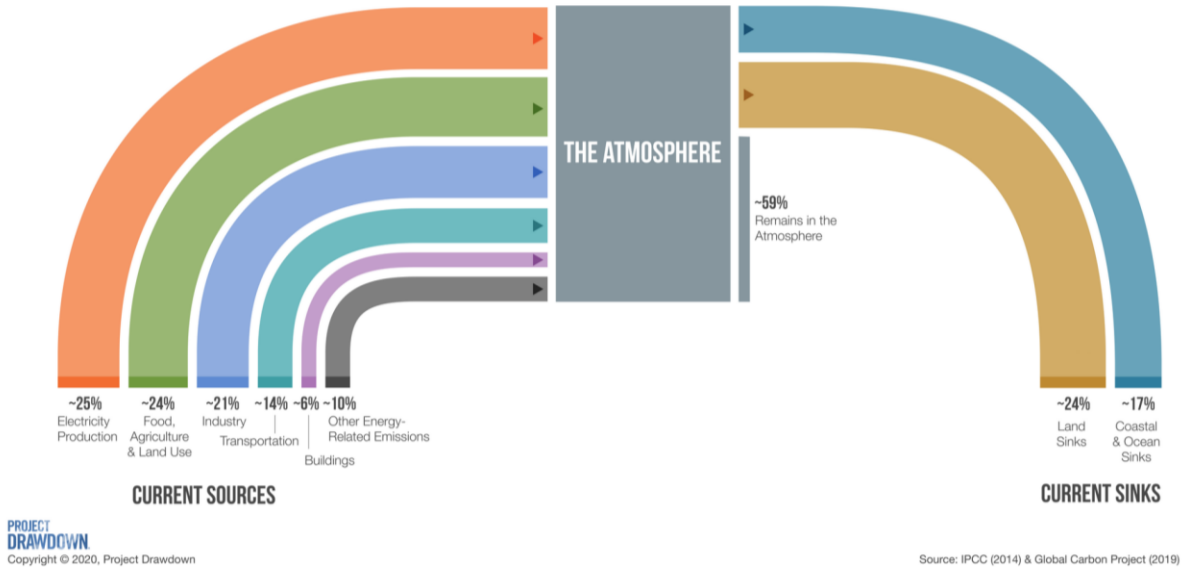
Climate change and other threats are requiring farms to constantly adapt to new conditions and work collaboratively with state and local governments to obtain the financial and knowledge-based support they need to continue farming. While this chapter cannot comprehensively address all the challenges identified by local producers and stakeholders, it offers recommendations and solutions that tackle the major themes of managing climate change risks, supporting the local agricultural economy, and protecting and enhancing agricultural lands. None of these themes are unique to Hatfield, but there are steps the Town can take to address some of these challenges and demonstrate leadership in exploring bold and innovative solutions that will inform and inspire other municipalities across the state.



1 Hunter, M., A. Sorensen, T. Nogeire-McRae, S. Beck, S. Shutts, R. Murphy. 2022. Farms Under Threat 2040: Choosing an Abundant Future. Washington, D.C.: American Farmland Trust.

2 Lopez, R., Jelliffe, J., Laughton, C. 2020. Northeast Economic Engine: Agriculture, Forest Products and Commercial Fishing. Farm Credit East.

**Figure 1: Emissions Sources and Natural Carbon Sinks**




*Source: Project Drawdown ©2020*

**Key Takeaways and Recommendations**

The recommendations in this chapter focus on four priorities: protecting more farmland, supporting regenerative farming practices, resolving ditch and wetland conflicts, and re-activating the town Agricultural Commission. Many other ideas are also included, both on-farm climate mitigation and adaptation strategies, and additional regulatory action steps for the town to consider (See Section 4).

A thoughtful and proactive local government, along with informed and engaged residents, are integral components of any set of strategies to achieve the goals of this chapter. The next generation of farmers in Hatfield will need major public support and investment to sustain their operations and adapt their farming practices if the local agricultural culture and economy is going to continue to be a part of Hatfield's future.

## Summary of Outreach and Public Engagement

The Executive Office of Energy and Environmental Affairs encourages public engagement throughout the Massachusetts Municipal Vulnerability Program process. Development of this chapter involved: two gatherings with Hatfield farmers in March of 2023 and 2024, a written survey that received a very low-response rate; one-on-one interviews with nine farmers during the summer of 2023 (to supplement the survey).

In the first round-table discussion (March 2, 2023), producers talked about the major challenges they are facing in their businesses. The key themes that emerged were:

- climate change and the increasingly volatile/unpredictable weather year to year
- Hatfield's defunct local ditch and drainage system that has been negatively impacted by decades of development and neglect
- decreasing soil fertility
- the challenges to implementing cover crops
- unaffordability of farmland
- unavailability of labor
- high cost of infrastructure

These themes were further explored during one-on-one interviews (via phone and in-person) with nine active Hatfield-based farmers in August and September, 2023. These conversations followed a number of severe weather events over the 2023 growing season; a damaging late spring frost, followed by severe flooding along the Connecticut River and Mill River in July and early September. The outlook of many farmers during this time was less than optimistic; many were actively pursuing disaster relief assistance to cover financial losses, and feeling some hopelessness about finding any improvement to their situations in the near future.

The second workshop (March 9, 2024) included informative presentations on climate change adaptation strategies with a focus on soil health, perennial cover cropping, tree crops, and agroforestry. The group of farmers and agricultural service providers in attendance reviewed the preliminary recommendations presented in this chapter and ranked them according to the strategies that would most help individual farms to adapt and survive, and the strategies that would most help agriculture as a whole to thrive in Hatfield.

Farmer's Top Ranked Priorities on their own farms:

1. improve drainage
2. improve soil health
3. collaborate on funding opportunities

Top Ranked Priorities for all Hatfield agriculture:

1. re-activate Agricultural Commission
2. encourage public support and advocacy
3. protect farmland
4. improve drainage
5. collaborate on funding opportunities

While these priorities do not represent a consensus among the farming community, input from those who were interviewed and/or attended one or both gatherings was used to deeply inform the final recommendations.

## 2. Existing Conditions

### Background and Context to Hatfield Agriculture

The town of Hatfield, situated alongside the Connecticut River in Western Massachusetts, is home to some of the richest and most productive soils in the world.[3] Multiple generations of farm families have farmed Hatfield's meadows and floodplain terraces, some of which are still in farming today.[4] Two farms still operating today were established in the 17th century and several have been passed down through three generations or more. 37% of the town's acreage is classified as prime farmland (4,001 acres). Another 27% of the town's acreage has been classified as farmland of statewide (1,601 acres) or local (1,333 acres) importance. A quarter of the total land in town (2,755 acres) is currently cultivated as cropland or pasture, producing corn, hay, tobacco, dairy products, vegetable, nursery, and greenhouse crops.[5] There are currently 36 active farms with harvested cropland, 21 of which sell commodities wholesale or direct to consumer.[6] Today, the top three crops in broadacre annual production are potatoes, corn, and hay.[7]

**Table 1: Agricultural Statistics for Hatfield and Hampshire County**

| Hatfield (2017) | Hampshire County (2022) |
|---|---|
| • 36 farms<br>• 2,755 acres of farmland<br>• 965 acres (35%) in the 100-year floodplain*<br>• Mean farm size: 97 acres<br>• 4 farms greater than 250 acres | • 718 farms<br>• 53,268 acres farmland<br>• Mean farm size: 74 acres<br>• 10.3% of farmland in Massachusetts<br>• 9.5% of farms in Massachusetts |

** Based on 1980 effective FEMA flood map for Hatfield.*

According to the 2017 USDA Agricultural Census, most farms in Hatfield are under 50 acres (28 farms), with just two farms harvesting more than 500 acres of cropland. The majority (21 farms) also generate less than $50,000 annually in sales, though 7 farms report sales between $50,000-$249,999 and 8 farms generate more than $250,000. There are just 17 full-time farm owners in Hatfield, and 23 part-time owners. 32 individuals list farming as their primary occupation, and 83 individuals count themselves as producers engaged in farming at least part-time.

3 Hatfield Reconnaissance Report, Connecticut River Valley Reconnaissance Survey, Massachusetts Heritage Landscape Inventory Program. June 2009. https://www.mass.gov/doc/hatfield/download. Accessed March 2023.

4 Hatfield Historical Society. May 2022. https://hatfieldfamilyfarms.weebly.com. Accessed March 2023.

5 USDA/NASS Cropland CROS 2016. https://croplandcros.scinet.usda.gov. Accessed March 2023.

6 USDA/NASS 2017 Ag Census. https://quickstats.nass.usda.gov. Accessed March 2023. The 2022 Agricultural Census Data was not yet available by zip code at the time of this report.

7 USDA/NASS Cropland CROS 2016. https://croplandcros.scinet.usda.gov. Accessed March 2023.

Although the number of farms and acres in production in Hatfield has significantly declined over the last 50 years, agricultural activities remain a prominent feature of the town, and protection of working farmland and the town's agricultural economy is consistently named a top priority by residents concerned about the pace and impact of development.[8]

## Key Crops and Farm Industry

Since the early 1970s, Hatfield's farmland has been prized for potato growing. Local production increased after the closure of the South Deerfield pickling plant in 2006. Over 900 acres are currently in cultivation, yielding over 30 million pounds of potatoes (267 cwt) which are sold to fresh market grocery wholesalers from Maine to Florida. Potatoes grow well in the silty loam soils along the river, though producers struggle both in dry years to maintain adequate irrigation and in wet years to solve drainage problems and address disease pressures. However, remaining competitive in the industry is challenging. In 2022, Massachusetts accounted for less than 10% of all potato production in New England and a very small fraction of overall potato production in the United States.[9]

Despite no longer being a widespread cash crop, tobacco also remains an iconic crop for the region and keeps Hatfield connected to its agricultural heritage. Around 3,500 acres were once cultivated during the heyday of tobacco farming at the turn of the century before the industry consolidated, and over 120 old tobacco barns still dot many fields and farms. A small resurgence of broadleaf tobacco returned in the early 2000's for wholesale export to new emergent markets in Asia, but tobacco remains a very difficult and labor intensive crop to grow, and production in town has remained level over the past decade at around 50 acres.

Strawberries, pumpkins, gourds and decorative corn are additional prominent specialty crops grown on Hatfield farms, attracting local customers to roadside farm stands around town throughout the year. However, Hatfield agriculture has been diversifying in recent years in response to consumer demand for more locally grown products to include cut flowers, maple syrup, mushrooms, vineyards, and cannabis. Two local farms also offer vegetable CSA (Community Supported Agriculture) shares to local residents, although growing memberships and maintaining profitability through this model has proven challenging for both farms in recent years.

Hatfield is also home to two major agricultural inputs service providers, Helena Agri-Enterprises, LLC (headquartered in Tennessee) and TurfCare Supply, LLC (headquartered in Ohio). Black Birch Vineyard, a popular agritourism destination, and Good Stock Farm, an award-winning cooking school located on Main Street, draw visitors from across the state.

8 Priorities identified through surveys and communities meetings as reported in the Hatfield Master Plan (2001), https://www.townofhatfield.org/sites/g/files/vyhlif3246/f/uploads/masterplan.pdf and Open Space Plan (2014), https://www.townofhatfield.org/sites/g/files/vyhlif3246/f/uploads/2014openspaceplan.pdf

9 USDA/NASS January 2023 Crop Production Summary Report. https://quickstats.nass.usda.gov. Accessed January 2023.

Prospect Meadow Farm, a non-profit therapeutic farming social enterprise run by ServiceNet, Inc, also serves hundreds of families throughout the region.

**Figure 2: Unique Soils and Farm Locations. Pioneer Valley Planning Commission.**

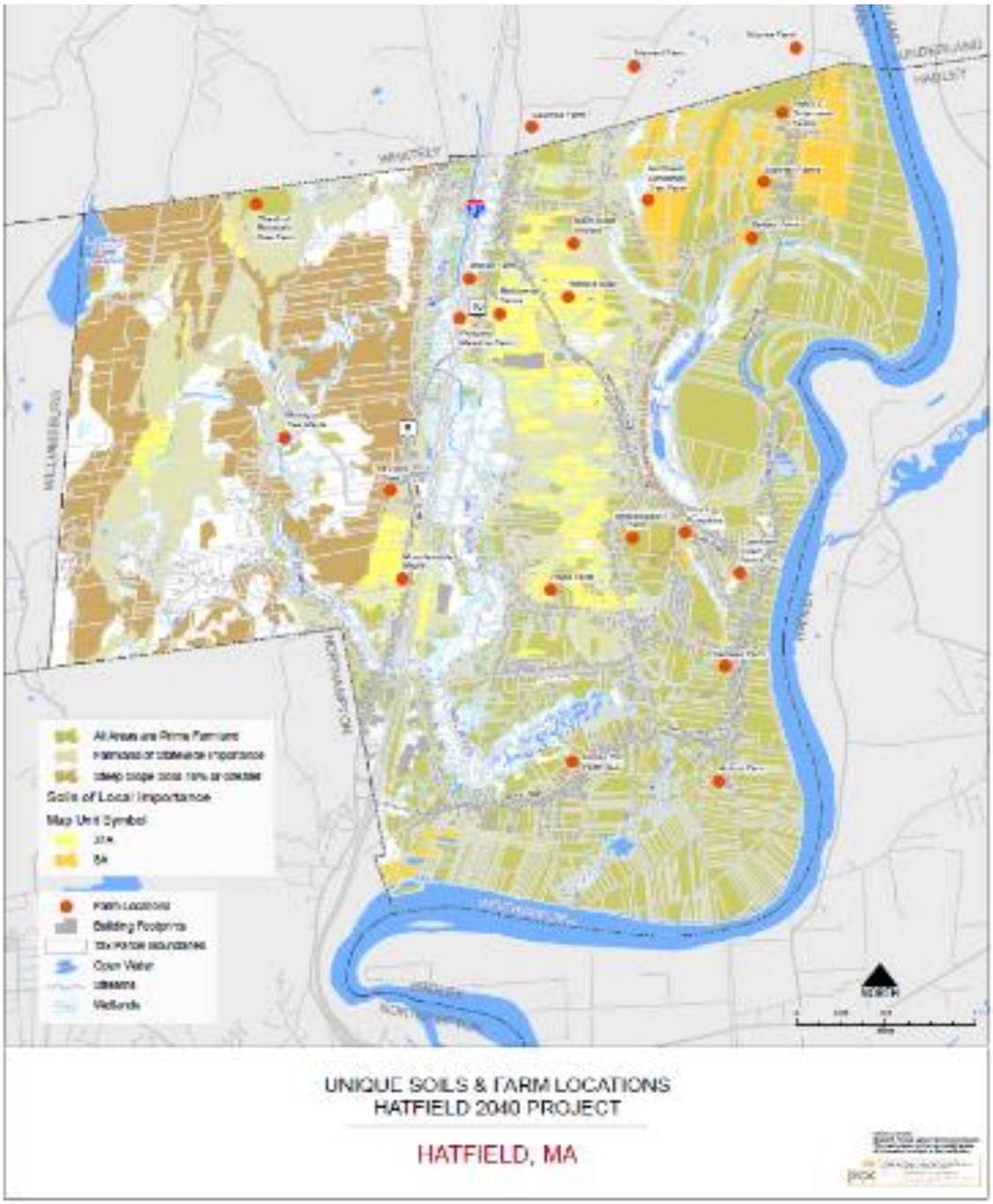


**Table 2. Inventory of Direct Retail Farms in Hatfield**

| Hatfield Farms | Year Est. | Products |
|---|---|---|
| Antosz Farm | 2008 | Field corn, onions, hay |
| Bardwell Farm | 1685 | Vegetables |
| Belden Farm | 1661 | Dairy, beef |
| Black Birch Vineyard | 2017 | Grapevines, winery |
| Chestnut Mountain Tree Farm | 1983 | Christmas trees, hay |
| Go Farm | 2012 | Pork, Chicken, Veggies, Soap |
| Golonka Farm | 1960 | Vegetables |
| Honey Pot Farm | 1902 | Vegetables |
| Malinowski Farm | 1908 | Specialty pumpkins |
| Mountainside Maple | 2019 | Maple products |
| Northeast Christmas Tree Farm | 1982 | Christmas trees |
| Pop's Farm | | Asparagus, decorative corn, |
| Prospect Meadow Farm | 2010 | Diversified vegetables |
| Riquezas del Campo | 2019 | Diversified vegetables |
| Skawski Farms | | Nursery/greenhouse |
| Smiarowski Farms | 1923 | Potatoes, strawberries |
| Start Farm | 1965- | Vegetables, popcorn |
| Szawlowski Potato Farms | 1910 | Potatoes |
| Tony's Pumpkins | | Pumpkins |
| Wendolowski Farm | 1945 | Onions, tobacco, vegetables, |
| Wilkes Farm | | Cut flowers, vegetables |

## Geological History

Around 20,000 years ago, Hatfield was submerged in a glacier two-miles thick. As the climate warmed and the glacier receded, a large glacial lake formed that stretched from central Connecticut to as far north as Vermont. The lake lasted for around 4,000 years, after which a combination of erosion and continuing geological changes slowly caused it to drain out into Long Island Sound. Varves, or banded layers of silt and clay that built up annually on the bottom of the lake, can be found throughout the Connecticut River Valley. These deep, rich alluvial soils, augmented by frequent flood events, are rich in organic matter and minerals, making way for the highly fertile and productive lands found in Hatfield today.

In addition to the fertile lowlands and terraces, the topography in Hatfield also includes the eastern half of Horse Mountain and the Rocks, rising 100 ft above the river floodplain. The higher elevations also serve as the aquifer recharge area for both of the Town's drinking water supply wells.

## Hatfield Soils

Hatfield's greatest agricultural asset are its excellent floodplain soils, of which 37% (4,001 acres) are classified as prime farmland. They consist of fine silt and sandy loam soils, the majority of which still flood either occasionally or frequently. Of the 21 soils found in the lowlands, 14 are class III or better. The dominant soil is Hadley silt loam, a class I soil (See Soils Map 1).[10]

The two predominant soils associations in the lowlands are the Hinckley-Merrimac-Windsor association, and the Hadley-Winooski-Limerick association.

- The Hinckley-Merrimac-Windsor association soils are deep, nearly level to steep, excessively drained, both sandy and loamy, and formed in outwash deposits in outwash plains. They are found mostly in the terraces above the floodplain. These soils are suited best to tree growth but can be droughty which may limit plant growth. The rapid permeability also increases the possibility for groundwater contamination.

- The Hadley-Winooski-Limerick soils are deep, nearly level, well to poorly drained, loamy soils formed in alluvial materials on floodplains. They are found mostly in broad bands adjacent to streams and rivers. They are exceptionally suited for growing agricultural crops as well as for tree growth. These soils are subject to occasional flooding and seasonally high water tables.

10 NRCS Soils Classification system; 1 is best, 8 is poorest and most constrained

## Current Land Use

Hatfield currently cultivates crops or pasture/hay on 2,756 acres in town (25.6%) (RDG Map 1). Although nearly two-thirds of Hatfield is situated on prime farmland and farmland of statewide or local importance, only half of its prime farmland is currently in cultivation. Additionally, the majority of Hatfield's farmland of statewide importance (85%) and local importance (64%) are found on non-cultivated land, largely in the rural residential district (RDG Map 2). The Agricultural Overlay District (AG), encompasses just 39% of these important soils.

**Table 3: Agricultural Land in Hatfield (10,767 acres total)**

| Land Use (2016) | Total Acreage | % of Town |
|---|---|---|
| Cropland | 2,282.0 | 21.2 % |
| Pasture or Hay | 473.7 | 4.4 % |
| Total Ag Land | 2,755.7 | 25.6% |

**Table 4: Prime Farmland, Farmland of Statewide Importance, and of Local Importance**

| | Total Acreage | % of Town | Acres on Ag Land | % of Total Ag Land | Acres not on Ag Land |
|---|---|---|---|---|---|
| Prime Farmland | 4,001.3 | 37.2% | 1,992.3 | 72.30% | 2,009 |
| Farmland of Statewide Importance | 1,601.0 | 14.9% | 231.6 | 8.40% | 1,369.4 |
| Farmland of Local Importance | 1,333.9 | 12.4% | 474.8 | 17.23% | 859.1 |
| Total | 6,936.1 | 64.4% | 2,698.7 | 97.93% | 4,237.5 |

The Floodplain Overlay District is determined by the FEMA 100-year floodplain that was mapped in 1980. Current land use shows that 35% of cultivated crop and pasture land is within the 100-year floodplain, and an additional 30% is within the 500-year floodplain (RDG Map 3). Additionally, Hatfield has a probable wetland area of 2,637 acres, or 24.5%

of the town. 508 of these probable wetland acres are currently cultivated in crops or pasture/hay.

**Table 5. Land in the 100-year and 500-year floodplain; Probable Wetlands**

| | Total Acreage | % of Town | Acres on Ag Land | % of Total Ag Land |
|---|---|---|---|---|
| 100-year Flood Plain | 2,664.6 | 24.7% | 965.3 | 35% |
| 500-year Flood Plain | 1,492.8 | 13.9% | 833 | 30.2% |
| Probable Wetlands | 2,637.0 | 24.5% | 508 | 18.4% |

Hatfield's best agricultural lands have been farmed continuously for over 350 years. The advent of broad acre mechanical cultivation and chemical use in the 20th century has lead to increasing levels of degradation to soil structure, biology, and carbon content has risen dramatically. Soil organic carbon (SOC) stocks are currently estimated to be medium or low in most areas of town; within cultivated areas, 745 acres (27%) are either low or very low, indicating unstable soils that are highly readable and unable to effectively infiltrate rain and floodwaters (RDG Map 4). In total, 3,929 acres (36.5%) of the town has been assessed as having highly degraded soils. However, wth 2,292 acres of that land currently in cultivation, there is a high regeneration potential (RDG Map 5). This land is not only critical to protect from development, but should be prioritized for initiatives that restore and regenerate the productive capacity of the land (RDG Map 6).

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## Agricultural History

In the 20th century, Hatfield experienced a number of social and ecological events that continue to reverberate today. National politics, technological innovation, immigration policies, and natural disasters have all deeply imprinted local families and shaped the current patterns of local land use and agricultural production.

Prior to colonial arrival in 1661, the Norwottuck tribe built settlements that dotted the floodplain and practiced horticulture, fishing for shad and salmon in the river, and hunting in the wooded uplands. From the 17th to the 20th century, fertile floodplain soils facilitated an agricultural boom that formed the base of the colonial economy, with commodities ranging from wheat, flax, and broom corn to cattle, hogs, and sheep.

At the turn of the 20th century, just two crops dominated all agricultural production in Hatfield: tobacco and onions. After a long period of relatively steady growth, Hatfield experienced an unprecedented population increase of 65%, mostly attributable to the influx of immigrants from Austria and Poland. In 1915, nearly 40% of the town's 2,600 residents were foreign-born. While most of Hatfield's post-colonial French and Irish immigrants had initially come as railway laborers, the booming tobacco and onion industry offered plentiful employment opportunities for newly arrived farmworkers from Eastern Europe. After the tobacco industry consolidated in 1937 and prices dropped, many farmers turned to potatoes, cucumbers, asparagus and other field crops to diversify their operations.

The post-war era in Hatfield brought increasing industrial development, economic diversification, and agricultural consolidation, and included the completion of the I-91 Interstate Highway, bifurcating the agricultural assets along the river from the burgeoning commercial corridor along Routes 5&10. A housing boom in the 1970s and 1980s mirrored another significant 30% increase in population from 2,350 in 1960 to 3,045 in 1980, which reflected another silent crisis in the agricultural world: the advent of broad-acre mechanization and the development of new national policies favoring large farming operations over the small family farm, which also coincided with the rise of major agribusiness corporations. During this time period, a significant amount of family farmland in Hatfield was sold for its one-time developmental potential, creating a surge of single-family residential housing on two-acre lots that divided and checkered the open landscape.

## Farmland Protection

In a 2022 report, "Farms Under Threat: 2040" American Farmland Trust (AFT) found that between 1985 and 2016, 31% of available Massachusetts farmland was lost to development or reforestation; notably, a little over half of this 31% was converted to non-developed land cover, including reforestation and expanding wetlands.[11] Under the AFT scenario modeling, depending on the pace of protection and improvement of land-use planning, Hampshire County stands to lose between 3,200 and 5,900 acres of farmland by 2040. Additionally, Massachusetts saw the conversion of nearly 16,000 acres, or 8%, of its productive cropland to other uses between 2007 and 2017. During those 10 years, an average of more than four acres per day were lost to development, infrastructure, and other purposes, most likely never to return to active agricultural production. "Farms Under Threat" ranks Massachusetts sixth

11 Hunter, M., A. Sorensen, T. Nogeire-McRae, S. Beck, S. Shutts, R. Murphy. 2022. Farms Under Threat 2040: Choosing an Abundant Future. Washington, D.C.: American Farmland Trust.

in the United States in farmland loss from 2001–2016, and ninth in terms of continued threats to farmland into the future.

Hatfield has been proactive over the years to utilize regulatory levers for the protection of farmland and open space. Yet the town has struggled to balance the preservation of natural resources with the need to attract preferential developers to generate more municipal revenue and provide more affordable housing in town. Still, protecting existing farmland remains a key priority for both farmers and residents, and barriers remain to ensure that this land is protected in perpetuity. Some land in town has reportedly been sold to long-time farming families as a de facto way of keeping it in farming. However, any unprotected farmland that is privately owned could abruptly transition out of production should the owners decide to fold their agricultural businesses due to a lack of economic viability or operable succession plan.

In 1977, the Massachusetts Department of Agriculture (MDAR) established the Agricultural Protection Restriction (APR) Program to begin addressing the development pressures on farmland throughout the state. The program provides payment for the difference between the "fair market value" and the "agricultural value" of the land in exchange for a permanent deed restricting the use of the land for agricultural purposes only. Belden Farm, one of the oldest farms in the state, was an early APR adopter, and has placed over 220 acres of farmland in Hatfield under APR protection. However, the program has not been as popular with Hatfield farmers compared to surrounding towns. In 2023, there were just 7 farms with 406 acres (14.3% of cultivated land) enrolled in the program, compared to over 2,695 acres protected in nearby Hadley. There are many reasons why farms may choose not to participate in this voluntary program:

- The APR payment rate does not meet the needs or expectations of farm owners
- Farm owners do not wish to restrict the future development potential or uses of their land
- Farm parcels, particularly in the meadows, are non-contiguous and/or under 5 acres, and are thus not eligible for the APR program

The APR program has gone through some changes over the decades, and policy advocacy is continuing to improve the program's effectiveness. Yet barriers remain, as the program requires the cooperation of many private and municipal stakeholders to see the process through to completion.

Chapter 61A is a tax relief incentive program that gives the town the first right of refusal (ROFR) to purchase any land in 61A listed on the market in exchange for a reduced assessment rate. If a parcel is withdrawn from the program for residential, industrial, or commercial use, a penalty of back taxes and interest must be paid for the previous five years under certification. The program requires a minimum of 5 acres and active farming with annual gross sales of at least $500 to qualify for the tax relief. There are currently 2,972 acres enrolled in 61A, with 69% currently cultivated in cropland or pasture (RDG Map 7).

However, that leaves 852 acres of cultivated land not enrolled in the program. While 61A is not a reliable method to permanently protect farmland, it does provide the town some ability to track key opportunities to purchase the development rights on land most vulnerable to development.

**Table 6. Chapter 61A Land**

| | Total Acreage | % of Town | Ag Land in 61A | % of Total Ag Land in 61A | Ag Land not in 61A | % Ag Land not in 61A |
|---|---|---|---|---|---|---|
| 61A | 2,972 | 27.6% | 1,903.7 | 69% | 852 | 31% |

Another critical tool for farmland protection is the Community Preservation Act (CPA), a 3% surcharge on local real estate taxes established in 2008. Land conservation is an important eligible expense under CPA and projects are reviewed by the local CPA Committee and typically recommended to Town Meetingfor approval. Through the program, Hatfield has raised $1.9 million from local CPA collections and received $1.6 million from the State Trust Fund – an 88% state match. Through FY 2023, $2.4 million has been awarded in support of 44 projects. One of those projects funded the development of a half-acre community garden located next to Hatfield Elementary School in 2018; another project funded the purchase of a conservation easement on 22 acres of the Sliwoski Farm (now farmed by Black Birch Vineyard) on Straits Rd that was slated for an 18-lot subdivision in 2019. More CPA funds could be used to protect more farmland, if approved by Hatfield residents.

The town has also taken the additional proactive step of setting up a local APR Fund. A new stipulation of the APR program requires a municipal match of between 5-20% of the cost, and Hatfield was one of the first municipalities in the state to adopt an APR Fund out of their CPA Funds, setting aside $40,000 in 2013[12]. This fund is a critical tool that allows the Town to respond quickly to APR opportunities, and only requires the approval of the Select Board rather than a Special Town Meeting. To date, the fund has been used twice to provide matching funds for APR projects, protecting a total of 37 acres of farmland. It will need to be replenished periodically from the CPA funding pool to continue to support local contributions to future APR purchases.

Lastly, a new opportunity through the National Resource Conservation Service (NRCS) permitted the town in 2019 to become the first in the state to identify farmland of local importance. These soils must contain at least 50% important farmland soils that have historically been farmed, despite not being classified as “prime farmland” in the National

12 See Article 29 of the 2013 Annual Town Meeting Warrant

Soil Survey Geographic Database (SSURGO). By identifying and mapping these soils, Hatfield is now eligible to apply for federal funding through the Agricultural Conservation Easement Program (ACEP) when attempting to preserve parcels on farmland of local importance.

**Table 7: Protected Farmland**

| | Total Acreage | % of Total Ag Land |
|---|---|---|
| APR | 406 | 14.7% |
| CR | 84 | 3.1% |
| Other | 31 | 1.1% |
| Total | 521 | 18.9% |

As of December of 2023, Hatfield had a total of 521 acres of legally protected farmland, approximately 19% of total cultivated land (RDG Map 8). Most of the protected farmland in town has been protected with an Agricultural Preservation Restriction (APR) or Conservation Restriction easement; and an additional 27 acres are owned by the Town through a CPA-funded purchase, and 4 acres are protected by the Kestrel Land Trust for use as a community farm (Table 7).

## Agricultural Bylaws

In 2003, Hatfield adopted an Agricultural Overlay District (AG) and new bylaws to begin restricting the types of development permitted on prime farmland and farmland of statewide importance. The bylaws require a special permit for any new construction or renovation in the agricultural district, with input from the Agricultural Commission on recommendations to help reduce the negative impacts of the proposed development. Such measures can include wider buffer zones, visual screens, and windbreaks. Within the current Agricultural District, 1,427.7 acres (69%) are currently under cultivation. However, 1,328 acres (48%) of currently cultivated land lies outside the Agricultural District, and thus would not be reviewed for special permit considerations unless it was also placed into Chapter 61A or another conservation program. See 2021 Hatfield Zoning Map.

**Table 8: Hatfield Agricultural Overlay District**

| Land Use | Total Acres | % of Ag Zone |
|---|---|---|
| Cultivated or Pasture | 1,427.7 | 69.2% |
| Not Cultivated or Pasture | 634.7 | 30.8% |
| Total: | 2,062.4 | |

| Land Use | % inside Ag Zone | % outside Ag Zone |
|---|---|---|
| Cultivated or Pasture | 51.8% | 48.2% |

Hatfield has also adopted two bylaws to encourage the preservation of natural resources: the Open Space Development Bylaw (OSB) and the Transfer of Development Rights Bylaw (TDR). In the past five years, the OSB has been applied to just one development project on Old Stage Rd. Another bylaw permitting the Accessory Dwelling Units (ADUs) in the rural residential district was approved in 2019 to help diversify housing options: a key regulatory tool that could also help reduce development pressure on surrounding farmland.

**Table 9: Timeline of local initiatives to support agriculture and preserve farmland**

| Year | Initiative | Who/How |
|---|---|---|
| 2002 | Established an Agricultural Commission | 2002 Master Plan |
| 2002 | Designated Agricultural District | 2002 Master Plan |
| 2003 | Open Space Bylaw | Planning Board |
| 2003 | Transfer of Development Rights Bylaw | Planning Board |
| 2004 | Adopted Right-to-Farm Bylaw | Ag Commission |
| 2004 | Lowered agricultural water rates[13] | Ag Commission and DPW |
| 2004 | Published the Hatfield Farm Guide + Map | Ag Commission |
| 2005-2012 | Art of Farming Mural Project | Ag Commission and Smith Academy |

13 In 2004 Ag water rates started at $1.00/ccf versus the regular rate of $1.75. In FY24 ag water rate is $3.27/ccf versus regular rate of $6.31. Farms must gross $15,000 per year on a Schedule F to qualify.

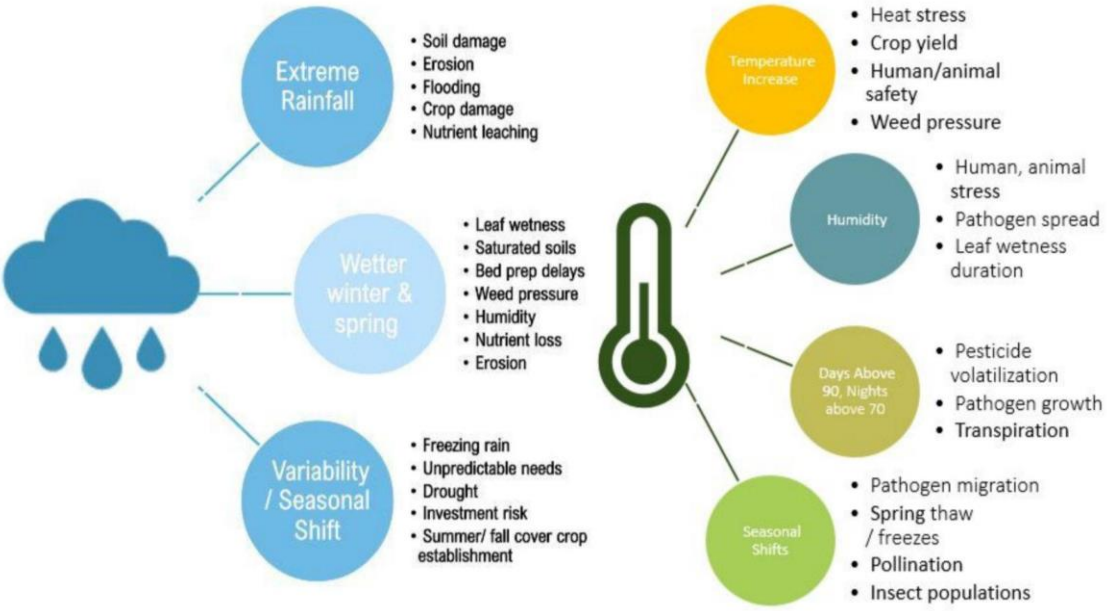
| | | |
|---|---|---|
| 2007 | Hatfield Harvest Festival and 5K | Ag Commission |
| 2008 | Local Food Preference Bylaw | Ag Commission |
| 2008 | Adopted CPA at 3% | CPA Commission |
| 2010 | Launched Hatfield Farm to School FRESH program | Ag Commission and Hatfield Public Schools |
| 2013 | Published guidelines for solar installations on farms | Ag Commission |
| 2013 | Established an APR Fund | CPA Commission/ Town Meeting |
| 2014 | Lowered Ag rates for building/greenhouse permits and inspection services | Ag Commission/Building Inspector |
| 2019 | Accessory Dwelling Units Bylaw | Planning Board |
| 2020 | Identify soils of local importance | Ag Commission/NRCS |
| 2023 | Elementary School Garden Program | Hatfield Public Schools |

## 3. Challenges and Opportunities

### Hatfield's Changing Climate

A variable and unpredictable climate is not new to agricultural producers. However, the unpredictability and the severity of climate events in the area has noticeably increased in the past decade, and producers are now facing unprecedented challenges relative to risk management and climate adaptation (See the Addendum to this chapter).

**Figure 3: Climate Impacts in the Northeast. Source: American Farmland Trust, 2023**




Both 100- and 500- year flood events have occurred in the town's recent history. The first short section of an earthen levee dike was hand built in 1902 to control spring flooding from the Connecticut River in the center of town. The dike was later expanded by the Works Progress Administration (WPA) following the Great Flood of 1936, which buried fields in silt that had to be hand dug and removed. The hurricane of 1938 also leveled barns and caused widespread flooding. Major hurricanes returned to Hatfield in 1954, 1955, 1960 and 1976, and a large flood occurred again in the spring of 1984 causing major damage to local farms.

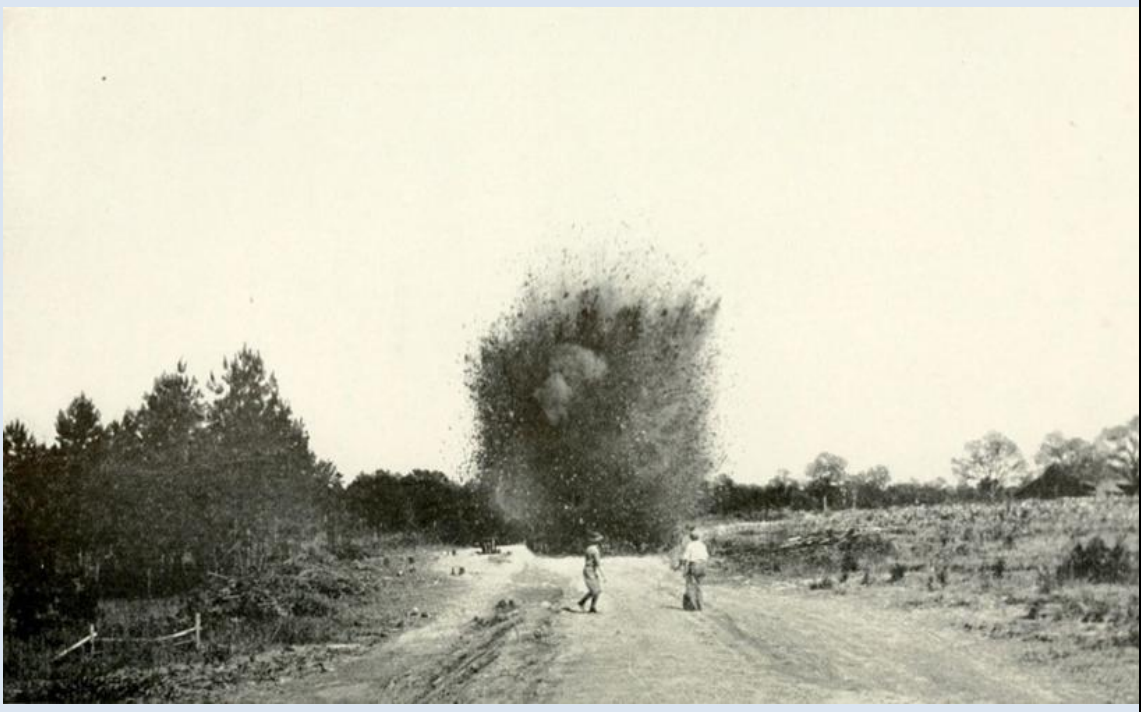
Flooding events in 2005 and 2014 remained localized to the Mill River, yet still heavily impacted many farms. More recently, rainfall from several large storm systems in 2021 and 2023 caused widespread damage. In July of 2023, Hampshire County received 11.75 inches of rain, a 7.44 inch departure from the usual monthly average rainfall of 4.31 inches.[14] July of 2021 was an even heavier month of rainfall with 12.34 inches of rain; another 3.53 inches fell in a single day in September 2021. These two years contrasted alarmingly with a drought in 2022, during which only 11.4 inches of rain fell over the entire growing season from May to August.[15]

14 Monthly Precipitation Totals and Departures from Normal - July 2023. Northeast River Forecast Center (NERFC) https://www.weather.gov/nerfc/ESSJUL. Accessed September 2023.

15 Hampshire County, Massachusetts Weather Data. National Centers for Environmental Information (NCEI). https://data.thespectrum.com/weather-data/hampshire-county/25015/2023-07-01/table/ Accessed September 2023.

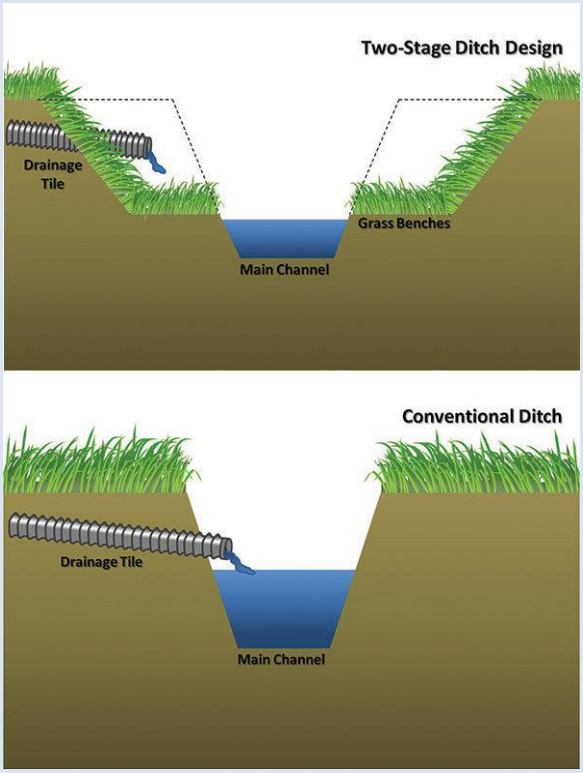
One of the most difficult situations arising during high precipitation events is the inundation of the old and unmaintained network of drainage ditches constructed around the turn of the 20th century during the rapid expansion of the local agricultural industry. Flood waters can easily bury fields in silt and contaminate crops, but they normally rise and recede relatively quickly. However, waters that do not drain away for several days can cause even more damage to infrastructure, adding additional liability and lasting financial implications for affected farms. Even if the ditches had been maintained for agricultural use, they were ultimately never developed to handle the new emerging hydrological regime of extreme precipitation and frequent flooding. Finding a new approach to ditch management on a town-wide basis is a top priority for local farmers.

Drainage Ditches were constructed in the late 1800s and early 1900s all along the Connecticut River to turn Hatfield's wet, fertile floodplain into tillable farm fields. Some were hand dug, but many were blasted with dynamite during the heyday of land clearing for the rapidly expanding agricultural industry. These ditches formed an extensive network of drainage channels and sinks throughout the "lowlands" of Hatfield to help heavy rains and flooding to dissipate more quickly; it also represented a massive shift in the ecological makeup of these lands, which included a large-scale removal of trees and other riparian wetland species to create bare open soil for tillage-based annual agriculture.



*Use of dynamite on a Pennsylvania Farm, 1911 (Licensed under the Creative Commons)*

As Hatfield farmland was gradually developed for more residential and commercial uses, many of these ditches have become overgrown, or separated from their original farm. Where they have not been maintained, farms who rely on old drainage systems to relieve some of the pressures of increased rain and flood events have been left without the ability to farm some of their fields, suffering significant crop losses when they do attempt to plant them. Furthermore, wetlands protection laws in Massachusetts can complicate matters when old ditches not on continuously farmed land are re-classified as wetlands, with costly penalties for disturbance. Farmers are unwilling to risk conflict with conservation officials, yet are left with few options to restore the drainage systems, especially when the ditches are no longer on their land.




Drainage ways reverting back to wetlands may better represent the previous character of the land: a valley filled with back channels and wetland complexes. Such ecosystems are vital for the optimal functioning of local ecologies by increasing land-based carbon sinks and sequestration capacity. Yet there may still be innovative options to achieve multiple ends, such as installing vegetated ditches and two-stage ditches to help reduce agricultural runoff. Hatfield will need to carefully assess which ditches to prioritize and repair for agricultural use and which to protect as wetland habitat, as well as come up with a long-term plan for ongoing evaluation and maintenance.

*Source: Kobel, R. Two-stage Ditch Design. University of Notre Dame Environmental Change Initiative, 2015*
https://environmentalchange.nd.edu/news-events/news/farmers-reduce-pollution-after-ditching-old-way-of-handling-runoff/

Warmer winter temperatures in recent years have also reduced the amount of snowpack in the lower elevations of Hatfield. In February of 2023, windy conditions, combined with fields left bare of vegetation for the winter, resulted in dust storms that were visible across the low lying floodplains; a soil loss event that could be preventable using conservation field management practices such as winter cover cropping.

Also in February of 2023, an unusual deep freeze of arctic air all but wiped out peach and plum crops across the state, and an unexpected late frost in May damaged about 60% of the state's apple, pear, and blueberry crop. In Hatfield, Black Birch Vineyard lost 80% of their grape crop when temperatures dipped to 25°F for five hours on the morning May 17, 2023. Other local farms lost strawberries, a high value specialty-crop that generates much needed

income early in the growing season. These climate-related disasters, along with the devastating floods in July and September, ruined over 3,000 acres of crops, primarily in the Connecticut River Valley of Western Massachusetts. Special disaster relief was deployed through the State's Natural Disaster Recovery Program, which provided $20 million to 347 farms.[16] Many other private, non-profit, and community-based organizations stepped up to raise additional funds to provide support, relief and recovery. While most farms were able to survive with help, the stress of climate unpredictability and future uncertainty was deeply felt.

Lost production for corn, soy, hay, and potatoes in the Connecticut River Valley due to climate change is projected to reach $1.6 million annually by 2030, $2.7 million annually by 2050 and $3.7 million annually by 2090, relative to $21 million in current production for these crops.[17] Increasing the resiliency and adaptive capacity of Hatfield's farms will require major community support and public investment to help farmers adapt their farming practices if the local agricultural economy is going to continue to be a part of Hatfield's future. However, there is no one-size-fits-all approach. The actual risks to each individual farm vary considerably, and each farm will need access to a suite of financial, ecological, and business support to develop a unique operation that is resilient to disturbance and ultimately regenerative in creating new opportunities for economic growth and ecological flourishing.

Currently, about 90% of the food consumed in New England comes from outside the region[18], with relative abundance but often detrimental impacts to soil, water, and climate systems around the planet. Food Solutions New England, an interstate, multi-stakeholder advocacy and research organization based out of the University of New Hampshire claims that New England could grow and consume as much as 50% of the region's food (vegetables, meat, dairy, and seafood) by 2060 if we increase our agricultural land base from 2 million acres to 6 million acres, or 15% of the region. This bold vision, when combined with climate smart and nature-based land management practices, offer an enormous opportunity for a new generation of New England farmers to reclaim a prominent role in creating a healthier, more just and economically viable food system. However, implementing this goal will require the coordination and transfer of considerable financial and knowledge-based resources across public and private spheres; farmers alone cannot do this work without broad engagement and support from all sectors.

16 Moran, B. "Slammed by climate emergencies, Mass. farmers ask, 'Now what?'" WBUR, August 9 2023, https://www.wbur.org/news/2023/08/09/massachusetts-farms-2023-frost-floods-climate-change. Accessed September 2023.

17 Kirshen, P. Luna, M., Kinney, P., Douglas, E., Massachusetts Climate Change Assessment. 2022. Resilient Mass. https://www.mass.gov/info-details/massachusetts-climate-change-assessment

18 Donahue, Brian, et al. A New England Food Vision. Durham, NH: Food Solutions New England, University of New Hampshire, 2014.

## Additional Challenges

Farms in Hatfield face a number of challenges to stay in business year after year, though most of these challenges are not unique to Hatfield. They threaten almost all producers throughout the region, and will require continued advocacy and collaboration between public, private, and non-profit partners to address and resolve.

Hatfield faces many notable challenges to maintaining the continuity of its local agricultural economy including managing climate variability, restoring soil health, balancing the municipal budget, and supporting more diversified and robust local food markets. Climate risks thread through a variety of other economic and regulatory issues common to agriculture throughout the region that also threaten the health of Hatfield's farming sector.

A short list of additional challenges, gathered through conversations with Hatfield farmers and town officials, includes the following:

Farmland Protection

While 69.2% of Hatfield's agriculture is located within the Agricultural District, the rest is located in other areas of town. It is currently difficult to protect these parcels from development using existing resources at the state level, yet new federal funding options may now exist to support additional acquisition and protection.

Limited land access

There is practically no affordable farmland in Hatfield. Farmable land rarely goes on the market and is almost always retained within current farming families. Beginning farmers without a connection to an existing farm family are almost entirely excluded from starting a new farm enterprise in town.

Decreased soil fertility

Due to the unavailability of land and slim profit margins, fields are rarely allowed any period of rest. Land swapping is becoming a more common practice between farms to better rotate field crops, but soil health and productivity is in decline in many fields, especially fields with short-term leases. The economic need to maximize production each year discourages farmers from taking fields out of production or investing in expensive new strategies like cover cropping.

Limited Labor Supply

Agricultural labor is difficult to secure, and very few Hatfield residents are employed on local farms. Larger farms rely on temporary foreign workers registered through the H-2A Visa Program, or on undocumented workers from more urban centers. Providing access to housing, health care, and transportation for workers amidst complicated immigration and labor laws present significant hurdles to farms who need a reliable and skilled labor force. One farm reported at least a 25% shortage in their labor supply in 2023.

Farm Succession

Several of Hatfield's farms have been in the family for multiple generations. However, high debt loads and a general dissatisfaction with the prospect of earning a livable wage from farming has discouraged many young inheritors from staying in town to continue the family business. Finding successors to a farm operation takes an enormous amount of time and dedication and the lack of a succession plan threatens the viability of many farms with aging principal operators.

Limited Market Access

While a few of Hatfield's smaller farms have successfully diversified to produce a variety of different vegetables and other value-added products, most of the larger farms are dependent upon one crop or market for the majority of their income. They have invested heavily in harvesting and processing equipment that is suitable for one type of use, and the costs of altering their primary production are prohibitive. Most businesses try to cut costs wherever possible in order to achieve any level of business growth.

Grant Programs

While it is true that the federal government manages a litany of programs designed to help farmers manage risk and even infuse needed funds for key conservation practices, these programs and grants can be notoriously slow to deliver, with some farmers waiting one or two years for a response. Grant application deadlines also often directly conflict with critical farming timelines, restricting the applicant pool to those who have the time and capacity. And some farmers simply do not trust government programs and feel that only entitled growers should access these resources.

High Taxes

Like most small towns in the region, Hatfield struggles to offer high quality municipal services without overburdening its tax payers. Hatfield has already taken steps to further reduce the tax burden on agricultural producers through a discounted water rate (almost 50% lower) and reduced fees on building inspections for agricultural structures. However, agricultural buildings are still assessed at the same rate as residential properties, and there is no mechanism for reducing the excise tax on farm vehicles.

## Adaptation and Resiliency Opportunities for Farms

There are many different approaches to dealing with the challenges of a volatile and unpredictable climate. Most fall into the category of either mitigation or adaptation. Mitigation strategies work to reduce carbon emissions, draw carbon out of the atmosphere, and prevent the further exacerbation of climate change; examples include switching to renewable energy and reducing fertilizer applications. Adaptation strategies work with the changes to buffer negative impacts and allow for a relatively rapid return to essential functions; examples include building hoop houses, applying compost and installing irrigation. Many strategies fall into both categories, such as improving soil health, which

increases both carbon sequestration and water infiltration during high precipitation events. Both strategies are vital, and a thoughtful integrated approach can successfully develop into a regenerative process that increases both the resiliency and operational capacity of a system over time, positively impacting the environment, economy, and society as a whole.

**Figure 4: Regenerative Agriculture: A Whole Systems Approach**


*Regenerative Design Group*

While the threats and challenges of climate change are many, farmers have long been the leaders in researching and developing innovative solutions to complex land management challenges, and they are often the ones on the forefront of understanding and implementing adaptation and resilience strategies.[19] The following list includes the most impactful resiliency actions that farmers around the region are taking to mitigate and adapt to changing climate conditions, lower the risks of staying in business, and ultimately improve the outlook for rural farmlands and agricultural economies in the coming decades.

**Table 10: Key climate resiliency opportunities for Hatfield's Farms.**

| | |
|---|---|
| Soil health | Utilize cover crops and intercropping to reduce erosion, cycle nutrients, and fix nitrogen |
| | Limit soil disturbance and the use of heavy equipment |
| | Use contour or keyline plowing to enhance water infiltration |

19 Chambers, R., Ghildyal, B.P. Agricultural research for resource-poor farmers: The farmer-first-and-last model, Agricultural Administration, 20:1, 1985.

| | |
|---|---|
| | Increase soil organic matter (SOM) with compost and mulch |
| | Increase soil cover and maintain living roots in the soil year round |
| | Integrate annual crop, livestock, and tree crop systems |
| | Improve pasture forage with perennial crops |
| | Increase biodiversity |
| Flood and drought resilience | Improve soil health to increase water holding capacity |
| | Reduce peak flow, runoff velocity, and soil erosion |
| | Adjust nutrient application timing in excessive rainfall periods |
| | Expand irrigation capacity |
| | Install permanent raised beds |
| | Use sensors to measure water needs and application rates |
| | Water bank in non-drought years and develop rainwater storage systems |
| | Install tile drainage |
| | Convert wet cropland to perennial crops or riparian buffers |
| | Fallow land that is flood prone and allow to revert back to wetland conditions |
| Ecological Health | Restore natural ecosystems and enhance landscape connectivity |
| | Manage woodlands to reduce wildfire potential |
| | Create pollinator habitat |
| | Prepare for smoke and poor air quality |

| | |
|---|---|
| Temperature fluctuation | Use season extension greenhouses and high tunnels |
| | Use shade cloth and intercrop heat sensitive crops with taller crops |
| | Trial new more tolerant varieties or breeds |
| | Adjust the timing and/or location of farming activities |
| | Utilize climate-controlled storage facilities |
| | Optimize post-harvest cooling systems |
| | Ensure adequate shade and rest for employees |
| Reduce pest and disease pressure | Implement IPM practices |
| | Trial new more resistant varieties |
| | Improve soil biology |
| Economic risks | Diversify farm products and income |
| | Apply for grants to cover the cost of new infrastructure |
| Energy | Generate on-farm renewable energy (solar, wind, methane, biomass) |
| | Reduce on-farm fuel usage |

While innovative, many of these adaptation strategies or practices require an upfront investment in time, equipment, knowledge, labor, and/or supplies. This adds additional financial and resource constraints on already slim profit margins. Asking farmers to bear these costs as individual businesses in challenging economic conditions is not a sustainable approach. Widespread comprehensive adaptation is possible if a coalition of stakeholders can provide the significant investments needed to cover farmer-to-farmer education and any associated lost revenue during the time it takes to learn, implement, trial, and refine new farming practices.

## Agricultural Resiliency Opportunities for the Town

The Town of Hatfield can undertake several initiatives to reduce regulatory obstacles for farmers, promote the agricultural sector, increase farmland protection, and improve land access for beginning farmers. The following is a list of regulatory recommendations gathered with key input from producers and municipal workers.

**Table 11: Municipal Regulatory Opportunities to Support Agriculture in Hatfield**

| | |
|---|---|
| Protect Farmland | Use CPA funding to purchase and protect more farmland coming out of Chapter 61A |
| | Replenish APR Fund (with CPA funds) as needed to support local contributions to future APR purchases |
| | Create a system to track the presence of APRs on land in town to avoid any unintended construction or subdivision. (Enables the town to get a reduction in the local contribution required for future APR purchases.) |
| | Create a local farmland protection program that can be used to protect farmland of local importance through the NRCS ACEP Program |
| | Strengthen incentives for creative multifamily and cluster development and increase the number of small and accessory dwellings permitted on one lot |
| | Utilize a siting bylaw to ensure that new residential construction preserves as much open space as possible and can still be potentially leased as farmland |
| | Develop a solar overlay district that prioritizes solar development on non-agricultural land, incentivizes dual-use agrivoltaics to minimize harm and maintain productivity, or otherwise ensures that projects strengthen farm viability |
| Agricultural Ditches | Initiate a town-wide (or participate in a multi-town) initiative to map, inventory, and evaluate agricultural ditches for improvement or wetland restoration |
| | Implement a bylaw to authorize the Department of Public Works to perform necessary ditch maintenance on private land |
| | Explore the possibility of funding tax breaks or incentives for private residents to improve and/or maintain priority-identified agricultural ditches |

| | |
|---|---|
| Land Access | Open access to small plots of town-owned conserved farmland for beginning farmers |
| | Promote the use of protected land in Open Space Developments for farming use |
| Affordable Farm Housing | Automatically allow additional small or accessory dwelling units (ADUs) on residential parcels in the Agricultural Overlay District for family or farm labor. |
| | Explore or incentivize affordable housing development on converted farmland that uses Open Space Development (OSB) or Transfer of Development Rights (TDR) for Chapter 40B Compliance; connect farmland owners with preferential potential developers. |
| Leverage CPA or other grant funding | Reinvigorate the town's Conservation Fund and/or capitalize with private donations to fund soil health education and incentives |
| | Support and promote farmer and public education programing on conservation and regenerative farming practices |
| | Build capacity in the town to pursue larger agricultural grants and conservation funding opportunities |
| | Establish a local disaster fund for farms |
| | Offer incentive payments to private landowners to maintain drainage ditches |
| Tax Code | Consider a tax incentive for farmers who develop and implement a soil health and cover crop plan for 5 consecutive years |
| Local Resolutions and Bylaws | Create provisions within the Agricultural Overlay District that incentivize best practices such as low-till, cover cropping, riparian buffer plantings, agroforestry, and other conservation measures |
| | Pass non-binding resolutions at Town Meeting that support regenerative farming practices and regenerative local food systems |
| | Broaden the definition of farming and regularly examine town bylaws for clauses that may unintentionally hinder agricultural producers and creative new agricultural enterprises, especially in the Rural Residential and Town Center Districts |

## 4. Examples from other Communities

Hatfield is not alone in working to identify strategies that they can apply to support, promote, and protect the agricultural community in the 21st century. Rural communities across the country are grappling with the pressures of consolidated agriculture, economic stagnation, aging populations, and inadequate housing, to name a few. Hatfield has already made a considerable amount of progress in support of its agricultural heritage through initiatives coordinated by the Town's Agricultural Commission, several of which serve as models for other communities to replicate. Some initiatives that may serve to inspire additional steps that Hatfield can take as a municipality or as part of a larger coalition of rural towns are included below:

1. Build Maine is a coalition of stakeholders working across disciplines to build economically stronger, more successful towns and cities in Maine through strategic, high-impact investments. Low-density residential development (LDR), otherwise known as "rural sprawl," is a major threat to farmland in many rural communities in Maine. The coalition has engaged in policy action in several areas to help reduce rural sprawl, including recommending a comprehensive overhaul and modernization of the subdivision laws that promote development in growth areas such as crossroads, villages, neighborhoods, downtowns, and high-impact corridors. They have also worked to promote the establishment of municipal, regional, and state Land Banks, which are focused on the conversion of vacant, abandoned, and tax-delinquent properties into more productive and creative uses. These initiatives protect farmland by taking the development pressure away from outlying working lands and refocusing energy on revitalizing existing villages and neighborhoods. www.build-maine.com

2. A study on rural sprawl and farmland protection in Williamstown, MA outlined a number of zoning strategies and economic measures the town could take to reduce less desirable rural development, particularly of large homes by seasonal residents. The study did not support a reduction in the lot sizes or an increase in overall housing density, citing evidence that such strategies do not necessarily lead to the development of smaller, more affordable housing options. Rather, it encouraged passing bylaws to encourage more creative housing options in existing populated areas through renovation, infill development, cluster design, and multifamily zoning. https://ces.williams.edu/files/2022/01/McMansion-Envi-Planning-Final-Report.pdf

3. In Whately, MA, the Planning Board has approved a zoning strategy with two distinct Agricultural Overlay Districts. In Ag Zone 1, lot sizes with public water can be just 40,000 sq ft with 175 ft of frontage. In Ag Zone 2, minimum lot sizes without public water are 120,000 sq ft with 300 ft of frontage. There are also differing provisions for the approval of seasonal farm stands, outdoor marijuana cultivation, commercial kitchens, breweries, and solar. The two districts both offer key protections to farmland by graduating the types of land and building uses permitted in different areas of town.

https://www.whately.org/sites/g/files/vyhlif5211/f/uploads/2019_4-30_zoning_bylaws_approved_by_ag_3.pdf (See Section 171-10).

4. Regular maintenance on drainage ditches in Hadley, MA is performed by the Department of Public Works in accordance with town bylaws. Chapter 218, Article V authorizes action to prevent undesired water and/or ice from accumulating on roads, ways, and public or private property in the Town. Offending obstructions are subject to a $50 per day fine. Chapter 195, Article III also authorizes the Planning Board to serve as the Stormwater Authority to enforce the bylaw controlling the adverse impacts associated with stormwater runoff from new development and redevelopment.
   Ch. 218, Article V: https://ecode360.com/13510433
   Ch. 195, Article III: https://ecode360.com/35956989

5. In 2021, the Connecticut Land Conservation Council (CLCC) was awarded $6.7 million through the USDA Regional Conservation Partnership Program (RCPP) to create the Connecticut Conservation Partnership Program. The program provides a critical source of funds for Connecticut land trusts and municipalities to receive matching federal funds for applications to the Open Space and Watershed Land Acquisition Grant Program (OSWA). The program aims to conserve 30% of land in CT by 20230.

6. Funding from the USDA in 2019 supported the development of an Agricultural Innovation District in West Kingston, RI in partnership with the University of Rhode Island. The project, which includes 25 acres of greenhouses adjacent to a 15,000 sq ft Agriculture Innovation Center, hopes to become the epicenter for agricultural innovation, entrepreneurism, internships, and education.[20] Controlled environment agriculture is an area of rapid private sector growth and will need a trained workforce in order to develop the systems and technology needed to increase the quality and efficiency of production. Locally, Nourse Farms in Whately and Hatfield is already a leader in the biotech field adapting technological innovations to agricultural production.

7. Franklin County, PA offers a "Conservation Farmer of the Year" award to farmers who champion soil and water conservation practices. The award is given publicly in conjunction with other local farm promotion activities. Similar awards are also given out in Charleston, WV, Cumberland County, IA, Dubois, IN, and by the Northwest Connecticut Conservation District. This type of recognition uplifts the voluntary efforts of farmers and helps to educate the general public
   https://franklinccd.org/calendar/conservation-farmer-of-the-year/

20 "Gov. Raimondo, URI President Dooley announce first round of Innovation Campus projects." *Rhody Today*, December 18 2018, https://www.uri.edu/news/2018/12/gov-raimondo-uri-president-dooley-announce-first-round -of-innovation-campus-projects/. Accessed March 2024.

## 5. Recommended Goals and Strategies

Many of the ideas that Hatfield is already considering to mitigate vulnerability from climate change, enhance economic viability, protect natural resources, and improve the quality of living will also positively impact the protection of farmland and the overall viability of Hatfield's agricultural sector. Hatfield has already taken a number of steps to support farms over the last two decades, with both regulatory and non-regulatory initiatives. However, the town must ardently continue this trend and implement even more creative solutions to support, promote, and protect the agricultural community into 2040 and beyond.
The top four priority goals and strategies emerging from this chapter are as follows:

| | |
|---|---|
| Protect More Farmland | • Protect an additional 800 acres by 2040<br>• Promote Open Space Bylaw<br>• Limit low-density residential development |
| Support Regenerative Farming Practices | • Support and promote existing funding opportunities<br>• Celebrate local farms using best practices<br>• Act on future conservation funding opportunities |
| Resolve Ditch and Wetland Conflicts | • Assess the current ditch and drainage network<br>• Develop a town-wide plan for improvement<br>• Restore key wetland areas for flood mitigation |
| Re-activate the Town Agricultural Commission | • Improve representation of farmers in Town Government<br>• Promote Hatfield farm products and agritourism<br>• Educate the public |

### 1. Protect More Farmland

Massachusetts has an ambitious state-wide goal of protecting 30% of its farmland by 2030 and 50% by 2050. As a town with 25% of its total acres in farmland, it seems critical that Hatfield take a leadership role in protecting more farmland. In order to reach the 30% threshold, Hatfield would need to protect an additional 300 acres of farmland by 2030, and an additional 800 acres to reach 50%. This can only happen with a multipronged effort to increase landowner participation in existing state protection programs, augmented with either federal funding through the NRCS Agricultural Conservation Easement Program (ACEP), or by providing locally funded and administered opportunities through local land trusts or CPA-funded municipal acquisitions.

While the town works to expand its portfolio of permanently protected farmland, additional regulatory steps can be taken to actively promote creative cluster developments and appropriate siting of developments through the Open Space Bylaw. Other new zoning bylaws to promote the redevelopment of 3- and 4-unit multifamily houses, and increase the number of small dwellings or accessory dwelling units on each lot, will help limit the amount of new low-density residential construction and increase the amount of affordable housing available to low-income residents and first-time homebuyers.

**2. Support Regenerative Farming Practices**

Hatfield's best farmland has been farmed continuously for over 350 years. Farming practices changed considerably with the advent of modern tractors and cultivation equipment, and Hatfield's soils have degraded considerably in the effort to maximize short term production and profit. Many farmers in the Connecticut River Valley are beginning to explore novel cultivation techniques such as low-till farming and cover cropping that reduce the negative impact of industrial farming and help to conserve and rebuild the rich agricultural soils. These practices are also becoming vital measures to both mitigate and adapt to a changing climate. However, these practices must become more widespread, and there are a growing number of non-profit, state and federal financial resources available to farmers to help speed the rapid adoption of regenerative farming practices.

While Hatfield may not realistically have any regulatory levers to incentivize better farming practices, the Town must do everything possible to support and promote existing funding and educational opportunities. By creating a culture of support with non-binding resolutions and supportive bylaw language and celebrating local farmers who are improving their practices, the Town can help foster a sea change in public opinion about farming and the important role that farmers play in stewarding the town's most precious natural resources. Additionally, the Town must be prepared to act upon new grant opportunities that may become available to municipalities in the future to fund projects such as town-wide wetland restoration, riparian buffer implementation, and other key climate-smart conservation practices.

**3. Resolve Ditch and Wetland Conflicts**

A top concern for many Hatfield farmers revolves around the poorly-functioning network of agricultural drainage ditches constructed before the advent of environmental regulations. The direct conflict that has emerged in recent decades between conservation and agriculture over the maintenance of these ditches remains unresolved in many flood plain communities along the Connecticut River. The Town must develop a plan of action to address this conflict. A necessary first step will be to assess the current ditch and drainage network to identify which ditches remain vital for agricultural production and do the least amount of harm to environmentally sensitive areas. These ditches should be prioritized in a town-wide plan for improvement (i.e. with vegetation and/or two-stage reconstruction) and ongoing maintenance. Those remaining can then be targeted for wetland restoration as vital carbon

sinks and compensatory storage for flood mitigation. A coordinated effort by the Conservation Commission, Agricultural Commission, and Department of Public Works, in cooperation with the Department of Environmental Protection, will serve both farmers and private residents in proactively preparing for future flood events.

Concurrently, the Town can also work on strategies to educate private landowners about the impacts of regrading "old" ditches or allowing them to fill with brush and debris on agricultural production in town. If necessary, a small grant or incentive program could be devised to help landowners either appropriately maintain or restore the ecological function of any ditches on their land.

**4. Re-activate the Town Agricultural Commission**

Many of the farmers in town have a long history of engagement with the town on various issues. Some have volunteered countless hours serving on Town Boards and Committees, or are part of farm families who have had a considerable stake in the development of local policies and bylaws. With a limited number of younger, beginning farmers to draw upon, there is a limited capacity with which the existing farming community can respond to calls to action. Over the years, not every new initiative has resulted in measurable benefits to local farms, and disengagement due to age, lack of time, and waning interest has made it difficult to maintain ongoing initiatives, let alone start new ones.

Agricultural Commissions were created in towns throughout Massachusetts in the early 2000's to help farmers engage more effectively with local town governments. Members work together with town officials to encourage the pursuit of agriculture, promote agricultural economic development and protect farmlands and farm businesses, and preserve, revitalize and sustain agricultural businesses and land. Hatfield has benefited enormously from the activities of its Agricultural Commission since its charter in 2002 (See Table 4). However, the activities of many local Agricultural Commissions have waned in recent years, and Hatfield has recently lost three of its longest serving members in the last 18-months.

The importance of re-activating Agricultural Commissions across the state with funding and resources must be brought to the attention of local legislators in order for the town to increase their capacity to engage on a more strategic level and develop and implement new ideas and projects. Hatfield's Agricultural Commission could once again serve to raise the profile and representation of farmers' interests in town regulatory matters. With fewer available farmers from which to recruit new members, the Commission may seek to recruit new membership from informed residents, who are deeply invested in promoting and protecting the interests of a thriving local food system, some of whom may be relatively new to town. Re-energizing the Commission with new members will increase the capacity to develop clear, exciting, and achievable initiatives such as creating an Agricultural Innovation District or an Agricultural Climate Adaptation Zone. The Committee must also find creative new ways to engage with the public to help unite the town around its agricultural identity; engaging regularly with the school system, organizing annual events to promote Hatfield farm products and regular

agritourism opportunities, and providing abundant educational opportunities to residents to learn about regenerative farming practices and the vital role that local farmers play in stewarding the town's invaluable natural resources are all activities that could be undertaken by a revived and reactivated town Agricultural Commission.

The following is a list and timeline of possible goals and activities to be undertaken by the Agricultural Commission by 2040:

| **Activity** | **Immediate/ Ongoing** | **By 2030** | **By 2040** |
|---|---|---|---|
| Recruit new members, including students, backyard farmers and informed/passionate non-farmer residents | ✕ | | |
| Apply for grant funding to support new initiatives through the Berkshire Taconic Foundation or the Mass Society for Promoting Agriculture; advocate for a new state funding allocation | | ✕ | |
| Create a system to track the presence of APRs on land in town to avoid any unintended construction or subdivision. (Enables the town to get a reduction in the local contribution required for future APR purchases.) | ✕ | | |
| Initiate a town-wide process to map, assess, and address ditch and wetland conflicts on behalf of farmers and residents | ✕ | | |
| Create an map and inventory of most vulnerable/degraded parcels to prepare for forthcoming grant opportunities to fund intervention and/or restoration | | ✕ | |
| Seek out opportunities to partner with surrounding towns to apply for and/or administer larger USDA grant opportunities to address regional challenges such as flooding, soil compaction, wetland restoration, water quality improvement, etc. | | ✕ | |
| Support the hiring of an Agricultural Grants Manager to be shared among a group of surrounding towns to help farmers apply for | | ✕ | |

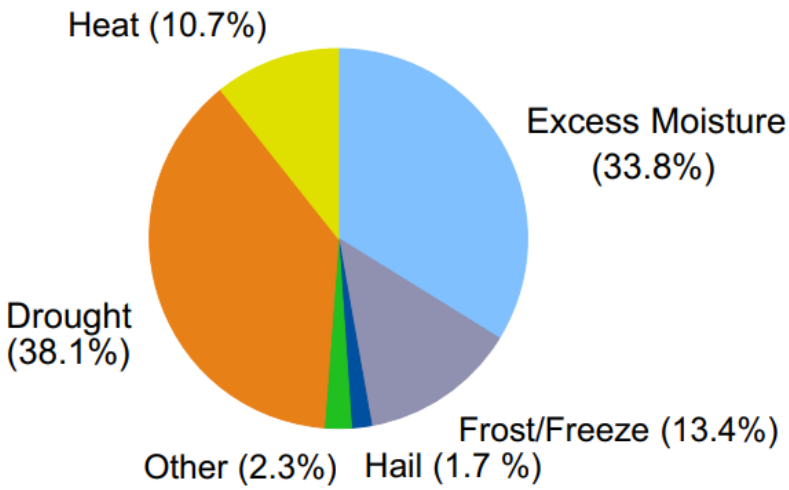
| | | | |
|---|---|---|---|
| individual grants and coordinate larger multi-farm/collaborative grant opportunities | | | |
| Complete a comprehensive survey of producers to assess the total economic impact to the town; build relationships with existing and beginning farmers in town | | × | |
| Update the Hatfield Ag Brochure and regularly promote on-farm agricultural events and agritourism opportunities; run a "Pride in Hatfield Grown" campaign | × | | |
| Organize community-building and/or fundraising events on local farms to celebrate the town's agricultural identity; potato potluck, local ingredient chili cook-off, concerts, film and lecture series, farm-to-table dinners, 5k race, art events, etc. | | × | |
| Give out a "Conservation Farmer of the Year" Award | | × | |
| Regularly connect with growers to ensure they are accessing appropriate technical assistance and current grant opportunities; connect to service providers | | × | |
| Create a farmer email listserv to facilitate the sharing of town-specific information that concerns farmers; could also be used between farms to share resources, equipment, peer learning, etc. | × | | |
| Encourage residential participation in land link programs to keep small acreage in farming; help advertise lease opportunities to current and beginning farmers | | × | |
| Promote the leasing of town-owned conservation land to small and beginning farmers; set up a market garden/farm incubator | | | × |
| Organize and/or promote local educational events and workshops on topics including: farm succession planning, soil health, pollinator health, regenerative farming practices, agroforestry, etc. | × | | |

| | | | |
|---|---|---|---|
| Create an Agricultural Climate Adaptation Zone to energize and incentivize climate-smart farming practices or to create a focal point for future adaptation grant funding | | | ✕ |
| Advocate for and advance the policy agendas of local, regional, and national food system organizations (i.e. Mass Food System Coalition, NOFA/Mass, National Sustainable Agriculture Coalition) | | ✕ | |
| Help fundraise or find sustainable funding sources for the Hatfield Public Schools Cafeteria to purchase Hatfield-grown produce | | ✕ | |
| Promote Hatfield Farmers: explore opportunities to aggregate and market Hatfield-grown products at events/fairs/festivals in surrounding towns | | ✕ | |
| Permanently protect 30% of Hatfield's working farmland (an additional 300 acres) | | ✕ | |
| Permanently protect 50% of Hatfield's working farmland (an additional 800 acres) | | | ✕ |

## Addendum to Farm Chapter
## Climate Vulnerabilities and Implication for Agriculture in the Northeast

Climate anomalies of high priority for the Northeast include changing rainfall patterns, summer heat stress, and shorter, warmer winters. In 2023, the USDA released an updated plant hardiness map showing significant temperature shifts and changes in average annual extreme minimum temperatures; Hampshire County is almost entirely now located within Zone 6A, formally mapped in 1990 as Zone 5B. Both analytical and anecdotal evidence support the fact that the climate is undergoing volatile and unpredictable changes that will have broad impacts - challenges as well as opportunities - for agriculture throughout the Northeast.

**Figure 1: Primary weather-related crop loss data reported to USDA-FSA, averaged across all crops for the Northeastern USA, 2013-2016**




*Source: Wolfe, D.W., DeGaetano, A.T., Peck, G.M. et al. Unique challenges and opportunities for northeastern US crop production in a changing climate. Climatic Change 146, 231–245 (2018).*

According to the USDA Northeast Climate Hub[21] and the Cornell University Climate Smart Farming Program,[22] Hatfield will continue to face the following challenges from predicted changes to climate patterns in the Northeast over the next 100 years:

21 Tobin, D. et. al., 2015. Northeast and Northern Forests Regional Climate Hub Assessment of Climate Change Vulnerability and Adaptation and Mitigation Strategies. Northeast Hub Northern Research Station USDA Forest Service. https://climatesmartfarming.org/wp-content/uploads/2015/09/Northeast-Regional-Hub-Vulnerability-Assessment-Final.pdf Accessed September 2023.

22 Wolfe, D.W. (December 2014). *How is Climate Change Affecting your Farm?* Cornell Climate Smart Farming Program. https://climatesmartfarming.org/changing-climate/ Accessed September 2023.

**Precipitation / Rainfall**

A warmer atmosphere holds more water. Because of this, more precipitation is occurring in heavy rainfall events (more than 2 in / 48 hrs), and this trend is expected to continue.

- Springtime flooding can delay planting
- Root damage and reduced yield due to flooding
- Soil compaction from the use of heavy machinery on wet soils
- Soil loss from erosion during heavy rain events
- Contamination of waterways from agricultural run-off
- Contamination and loss of crops touched by tainted floodwaters

**Drought**

The Northeast does not face the severe water shortages predicted for some other regions, but the risk of short-term summer drought is expected to increase over this century. Warmer temperatures and longer growing seasons will increase crop water demand, while summer rainfall will remain about the same or possibly decline.

- Declining and more variable yields of rain-fed crops
- Decline in quality of high-value fruit and vegetable crops

**Temperature**

Heat Stress Risk: The growing season across the state has already increased by an average of eight days. The number of summer heat stress days (e.g., exceeding 90°F) is expected to increase substantially, while winters continue to grow milder. These changes will create both opportunities and challenges for farmers.

- Warmer summer temperatures have been shown to decrease yields for certain varieties of grain crops (field corn, wheat, and oats) by speeding the development cycle and shortening the period during which grain heads mature
- Hot daytime (over 90°F) and nighttime (over 70°F) temperatures during critical phases of plant development can reduce the yield and quality of even "heat-adapted" crops such as squash and tomatoes
- Increased humidity is stressful for livestock and farmworker health and promotes favorable conditions for fungal and bacterial growth, leading to increased disease in crops (powdery mildew, fruit blotch, southern wilt).
- Potatoes, cabbage, snap beans, apples, and other heat-sensitive plants will be more challenging to grow

## Freeze Risk

While global warming is causing freezes to be less severe, spring frosts and freezes are not receding as quickly as flowering is advancing, resulting in increased freeze risk in frost sensitive orchards and vineyards.

- Warmer and more variable winters can increase the chance of frost and freeze damage for perennial fruit crops by inducing premature leaf-out and interfering with cold-mediated winter hardening

## Insects, Weeds, and Disease

Interactions between climate, crops, insects, and disease are complex, but evidence suggests that climate change will require Northeast farmers to invest in earlier and more intensive pest and weed management. Anticipating the challenge of increased weed and pest pressure will allow for better control and more cost-effective management.

Insect Challenges:

- Spring populations of insect pests will expand, as survivorship rates of marginally over-wintering insect species increase and migratory insects arrive earlier
- A longer growing season means more insect generations per season, requiring increased intensity of management

Weed Challenges:

- Warmer weather and increasing concentrations of carbon dioxide in the atmosphere favor weed growth over crop plants in many cases
- Weeds will need to be controlled for longer and weed seed production will be greater
- Certain weed species currently restricted to the warmer South are migrating northward, such as kudzu, while some familiar weed species (e.g. lambsquarters) are projected to become stronger competitors
- Pressure to use chemical control methods will increase as pest and weed infestation intensifies, and studies have shown the climate change may reduce the efficacy of certain commonly used pesticides (pyrethroids, spinosad) and herbicides (e.g. glyphosate)

Disease Challenges:

- Wetter soils from extended periods of rain are more susceptible to soil-borne pathogens, particularly *Phytophthora infestans* and *Phytophthora capsica*
- Climate-induced changes in the balance of pathogenic and mutualistic soil microbes may mediate plant nutrient supply, leading to an increase in nutritional deficiencies and decreased natural plant immunity to pathogens.[23]

23 Francisco I. Pugnaire et al. ,Climate change effects on plant-soil feedbacks and consequences for biodiversity and functioning of terrestrial ecosystems.Sci. Ad V.5 DOI: 10.1126/sciadv.aaz1834