



Northeastern Agroforestry



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SARE Research & Education Grant & SARE Partnership Grant

March 4, 2025



Agroforestry: An Overview

Agroforestry was developed as a set of indigenous land-use practices over thousands of years across our global community. Today, it is defined by the USDA as the intentional integration of trees and shrubs into crop and animal farming systems to create environmental, economic, and social benefits. This includes the practices of alley cropping, forest farming, riparian buffers, silvopasture, and windbreaks.

Agroforestry can help farmers reduce economic and environmental risks while adapting to a changing climate. The integration of trees with crops and/or livestock can help diversify income, build soil health, and reduce the impact of extreme wind, precipitation, heat, and drought. These systems can rebuild and improve ecological function within agricultural landscapes while increasing productivity.



Scaling Northeastern Agroforestry

Sustained research has confirmed that federal and state agencies often lack the training and resources needed to support farmers interested in developing and implementing agroforestry practices on their farms. This limitation hinders the adoption of these beneficial systems. Given that agroforestry systems require a long development period, research, education, and technical assistance is crucial for promoting their adoption.

To address these challenges, Interlace Commons collaborated with eight farms in Massachusetts, New Hampshire, and Vermont to design and implement agroforestry systems. This project intentionally involved farms with varying agricultural land uses and focused on three specific types of agroforestry practices: alley cropping, silvopasture, and forest farming. Definitions of these practices are provided below.



Alley Cropping

The intentional planting of trees with crops, using rows of trees and/or shrubs in a spatial arrangement to create alleys where the crops are grown. This includes orchard intercropping, annual intercrops, and alley coppice.



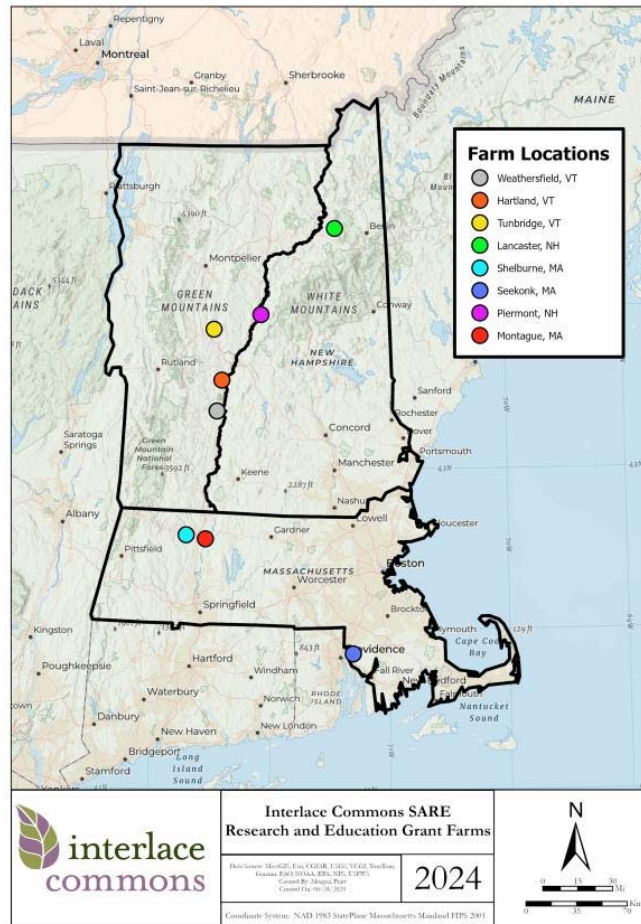
Silvopasture

The deliberate integration of trees and grazing livestock operations on the same land. These systems are intensively managed for both forest products and forage, providing both short- and long-term income sources. (USDA)



Forest Farming

The cultivation of shade-tolerant crops grown under the protection of a tree canopy that is often modified and managed to provide appropriate growing conditions. This commonly includes the production of forest botanicals and mushrooms.



(Above) Map of participating Farms

SARE Research & Education Grant:

Scaling Northeastern Agroforestry using a Farmer-Centered Field Consultancy Model



Montague, MA

Alley Cropping

The farm, located in Montague, tends bees in several locations across the Eastern U.S. and is headquartered in western Massachusetts. They produce honey, beeswax, and queen bees with the goal of enhancing the qualities of honeybees in local bioregions. In addition, they offer educational opportunities for beekeepers to help strengthen a resilient and diverse beekeeping community. Currently, they are working to reduce nectar scarcity and vulnerability by establishing perennial plants that will bloom during traditionally low nectar-producing times of the year.

Challenges

- The farm faces challenges with tillage due to the presence of quackgrass, a cool season perennial that spreads by rhizomes has been a challenge to eradicate making early attempts at alley cropping with annuals difficult.
- There are continued difficulties overwintering beehives in the Northeast and the associated costs that come with that process.
- Cash flow continues to be challenging at various times throughout the year, making financial planning a constant struggle.

Opportunities

The farm considers the northeast and central Atlantic region, particularly western North Carolina and Massachusetts, to be more climate-stable and resilient than Florida. Consequently, the farm is planning to relocate its operations to these two

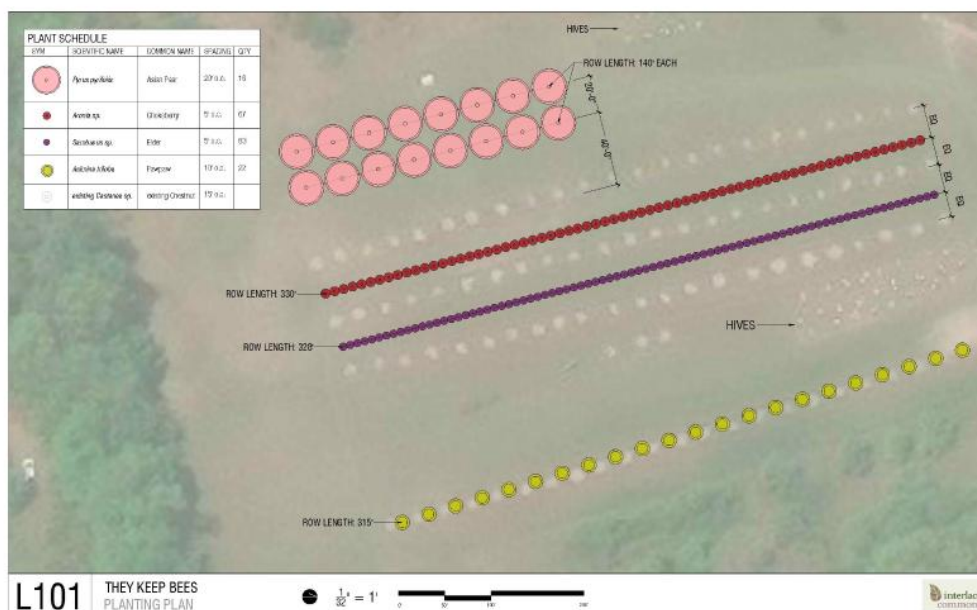
areas.

- There is growing potential for the farm to share its expertise in queen-rearing with other beekeepers and organizations.
- The farm is interested in continuing to engage with and developing local community through events and workshops to create opportunities that for marginalized populations.
- Additionally, they have an opportunity to expand their queen-rearing operations.



Mapping

To align with the goals of the apiary, which include increasing plant diversity for nectar production and developing other income-generating products, an alley cropping system has been designed that incorporates recently planted chestnut rows. This system is highlighted in pink on the adjacent site map and is situated above the Connecticut River, where the soil consists of sandy loam. This location and soil type have historically been suitable for agricultural practices, such as nursery production. However, the well-draining soils are currently depleted of organic matter and face challenges from weeds. As a result, perennial plants are now more desirable and easier to establish compared to annual crops or seed mixes that would benefit bees.



Planting Plan & Schedule

The alley cropping system incorporates existing chestnut trees, which are indicated by the lighter markings along the rows of chokeberry and elderberry in the planting plan. This system includes rows of shrubs planted in the alleys. Chokeberry (*Aronia melanocarpa*) and elderberry (*Sambucus nigra*) not only provide marketable farm products but also serve as a valuable nectar source for bees. In addition to the shrubs the pawpaw (*Asimina triloba* L.) and Asian pear (*Pyrus pyrifolia*) planting will also help to diversify farm income.

This photo shows the conditions of the site prior to the SARE Research and Education project. The producer collaborated with a planner and nursery owner to install hybrid *Castanea mollissima* trees, spaced twenty feet apart in-row and thirty feet between rows. Depending on the growth rate of the trees, the producer can expect to experience shade impacts between years twelve and fifteen, transitioning from partial shade to full shade once the trees reach maturity at thirty feet. If this producer intends to grow C4 plants (which use a different photosynthetic pathway than C3 plants), they will require full sun. Therefore, this spacing will necessitate a shift in production towards C3 plants, which are shade-tolerant, as the canopy of the *Castanea* begins to close.



Castanea orchard installed prior to the SARE Research and Education grant

Due to the site constraints, the producer was encouraged to install plant species that would produce yields as the canopy



Castanea orchard enhanced with perennial crops that can produce in full and sun and partial shaded conditions.

closes. *Sambucus canadensis*, was chosen as a shade tolerant crop that had a temporal difference from the chestnut crop that produces nuts in the fall while elderberry fruits in the summer. *Asimina triloba* L. were interplanted between chestnuts in one of the rows.



Seekonk, MA

Forest Farming

The farm in Seekonk, MA, is a non-profit organization that supports a cooperative of small-scale farmers and provides agricultural education programs. Current agricultural activities include growing vegetables, cut flowers, and medicinal herbs, as well as maintaining a small pasture for sheep grazing.

Educational programming, community involvement, and public access to the property are key components of their mission. The farming initiatives are often integrated with workshops, volunteer opportunities, and public engagement activities. The farm aims to conserve and steward the land while offering accessible farmland for the community.

Challenges

- Any significant changes to the landscape farm practices, such

as cutting down a large section of forestland, would require a discussion with the Board of Directors.

Opportunities

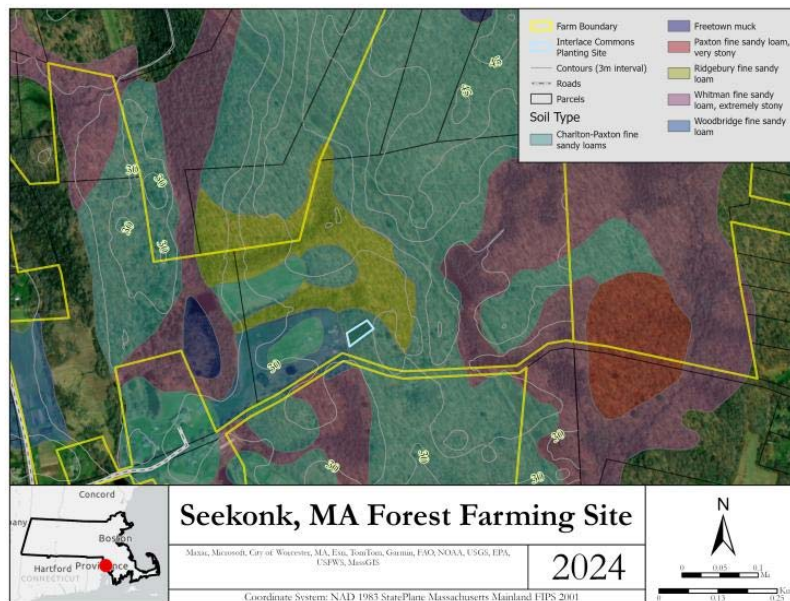
- Strong and valuable relationships with nearby farmers and organizations exist.
- Resident land stewards provide the farm with a close-knit group of helping hands when needed, as well as enthusiastic learners who are eager to engage with the work taking shape on the farm

Challenges

- Any major changes to the landscape or the farm practices (ie, cutting down a significant section of forested land) would require a conversation with the Board of Directors and family who owns the property.

Objectives

- Implement forest farming practices on a scale that we could use to pay forward the knowledge as a demo space
- Learn about the different motivations and impacts of forest farming has on an ecosystem

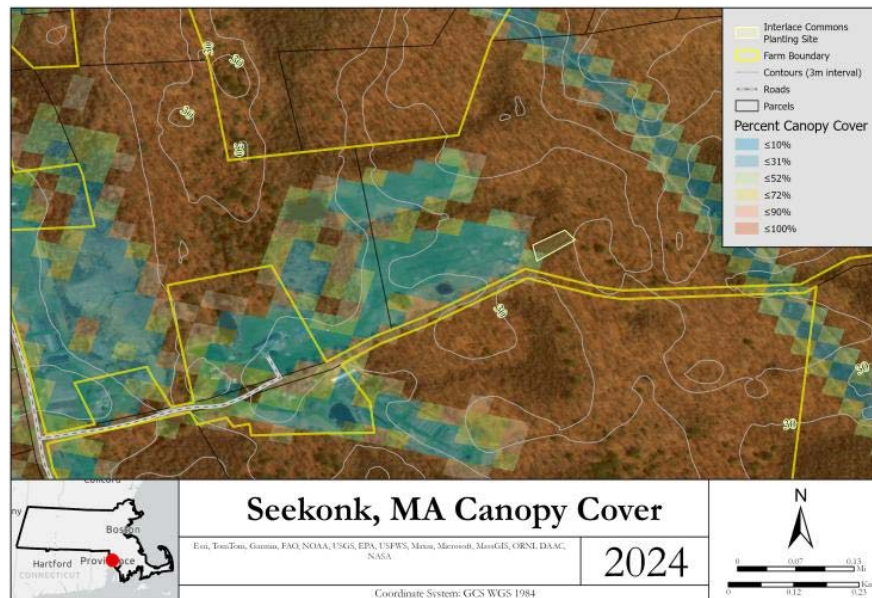


Mapping

Soils

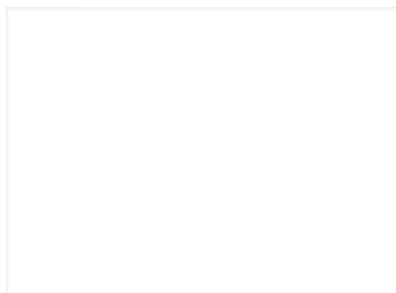
The participating farm has significant forested land and aimed to establish mushroom production for both income generation and educational purposes. The designated area for the laying yard, marked in blue on the adjacent map, is a flat region with convenient road access. This relatively low-lying space is shaded

by hemlock trees, offering ample shade and protection from the wind.



Canopy Cover

This canopy cover map demonstrates the optimal shade of the selected site compared to the rest of the property. Depending on the variety, shade cover for mushroom log yards may ideally be anywhere from 60% to 80% shade (Chamberlain et al. 2009; Hill 1999; Kalenius 2022). Wind protection and diffused lighting may also be ideal for cultivation of multiple species of mushroom offering additional advantages to site selection beneath increased canopy cover (Bruhn and Hall 2008; Kalenius 2022).



Community members inoculated mushroom logs using a farm-built table on wheels, which simplifies handling and access for efficient inoculation.

For the purpose of demonstrating a variety of species for community education, creating diverse offerings for potential markets, and selecting species that would match the available wood types that could be harvested from the forested land on site, oyster (*Pleurotus ostreatus*) shiitake (*Lentinus edodes*) and lion's mane (*Hericium erinaceus*) were chosen as mushroom species to grow.



Shelburne, MA

Silvopasture

The farm in Shelburne, MA is a small family operation that focuses on rebuilding soils, optimizing forage quality, and increasing the resilience of the local food system. They raise a variety of livestock including goats, pigs, and ducks with the intention of revitalizing compact pasture and clearing invasive plant species through rotational grazing and browsing. In the upcoming years, they aim to continue to expand their enterprise as well as the on-farm biodiversity.

Challenges

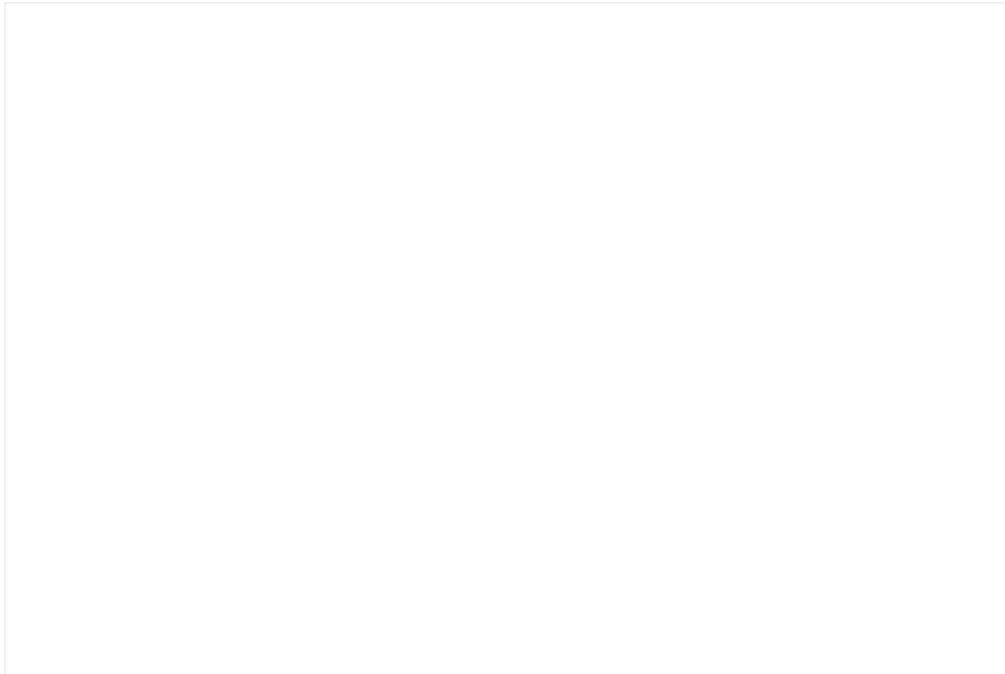
- The land has been overgrazed, leading to significant soil compaction and erosion, necessitating ongoing pasture improvements.
- The property includes two power line right-of-way paths that may restrict land usage or planting in those areas.

Opportunities

- There is unmet demand for the farm's existing products.
- Customers and nearby vegetable CSA (Community Supported Agriculture) members have expressed interest in partnering to support a meat CSA.
- The incorporation of silvopasture and associated browse banks have can improve animal welfare, and increase farm resilience against changing climatic conditions.

Objectives

- Supply a variety of protein options to the local community to enhance food security and participate in a decentralized food network;
- Raising happy and healthy animals that can exercise their natural behaviors;
- Reduce the need for medications, herbicides, pesticides, and other interventions through improved management and stewardship practices;
- Stabilize the local ecosystem by encouraging a diverse array of native plant and animal species;
- Reduce erosion, improve soil health and water retention; promote native plants through active animal management and suitable levels of grazing and browsing pressure;
- Create a sustainable income from farm activities to support the farm's ability to steward the property in an environmentally friendly manner.



Maps

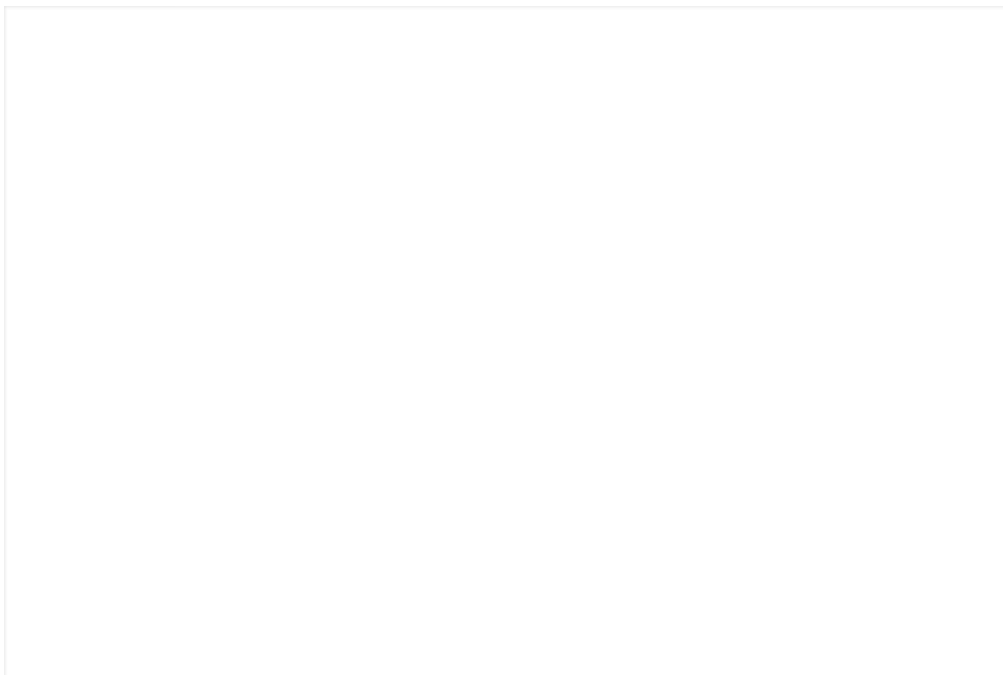
Soils

The farm has encountered several challenges since it began land stewardship in 2019, including increasing extreme weather events due to climate change, the proximity to the local watershed, and the need for pasture improvement. As shown on the adjacent map, the area designated for silvopasture planting is located on sloped land above the Deerfield River and consists of sandy loam and stony soils that are highly dispersive. Trees were chosen for this site to reduce soil erosion, enhance water retention, and benefit the grazing livestock.



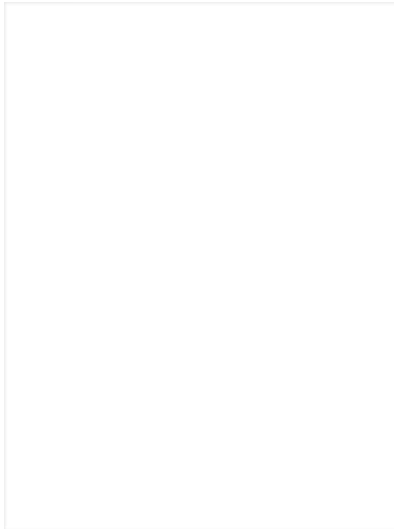
Watershed and Slope

Since beginning land stewardship in 2019, the farm has encountered several challenges, including increasing extreme weather events due to climate change, its proximity to the local watershed, and the need for pasture improvement. As shown on the adjacent map, the area designated for silvopasture planting is located on sloped land above the Deerfield River and consists of sandy loam and stony soils. Trees were chosen for this site to reduce soil erosion, enhance water retention, and benefit the grazing livestock. (Fike et al. 2017; Nair et al. 2005).



Planting Plan & Schedule

This silvopasture system includes rows of black walnut (*Juglans nigra*) interplanted with poplar (*Populus sp.*) The black walnut will provide dappled shade for livestock across paddock subdivisions, while the poplar can be grazed as forage in situ or cut and carried as fodder. Shade will address the heat stress that livestock are experiencing with increasing regularity, and the poplar will provide food banks during potential droughts and increase the diversity of nutrient availability.



(Left) Tree tubes protect young trees from predation, strong winds, and herbicide exposure. They create a moisture-retaining microclimate and help trees grow faster with better survival rates.

Tree tube considerations

When considering shelters for tree protection, several factors must be taken into account, including height, diameter, ventilation, and material. Shelters should be at least 5 feet tall to protect against deer, and it is best to choose the largest diameter possible to promote healthy tree growth. Good ventilation is essential, as it helps prevent fungal diseases and reduces the risk of shelters being blown over in the wind.

(Above) Tree tubes help protect the newly planted trees from deer, moles, and other threats for the first several years of establishment.



Lancaster, NH

Forest Farming

The farm in Lancaster, NH, is a maple sugar operation located on land that has been maintained as a sugarbush for over a century. In addition to producing maple syrup, the farm hosts community gatherings, educational events, and healing retreats. While the rural local economy can be limited in terms of market access, the farm is working to meet demand by attracting seasonal visitors, promoting agritourism, and diversifying its products.

Challenges

- Small rural markets
- Factors such as high winds, erosion, steep slopes, herbivory issues creating challenging growing conditions
- Instability in maple production given changing climatic conditions

Opportunities

- New farm business projects
- Promotion of nutritious food and medicinals
- On farm agrotourism experiences

Objectives

- Be reminded of what is sacred and invite these relationships to strengthen over time
- Engage in hands-on activities
- Expand knowledge of sustainable stewardship and deepen relationships with the land
- Focus on caring for livestock as soil growers, landscape cultivators, and providers of food
- Foster connections with others
- Live a well-balanced life



Maps

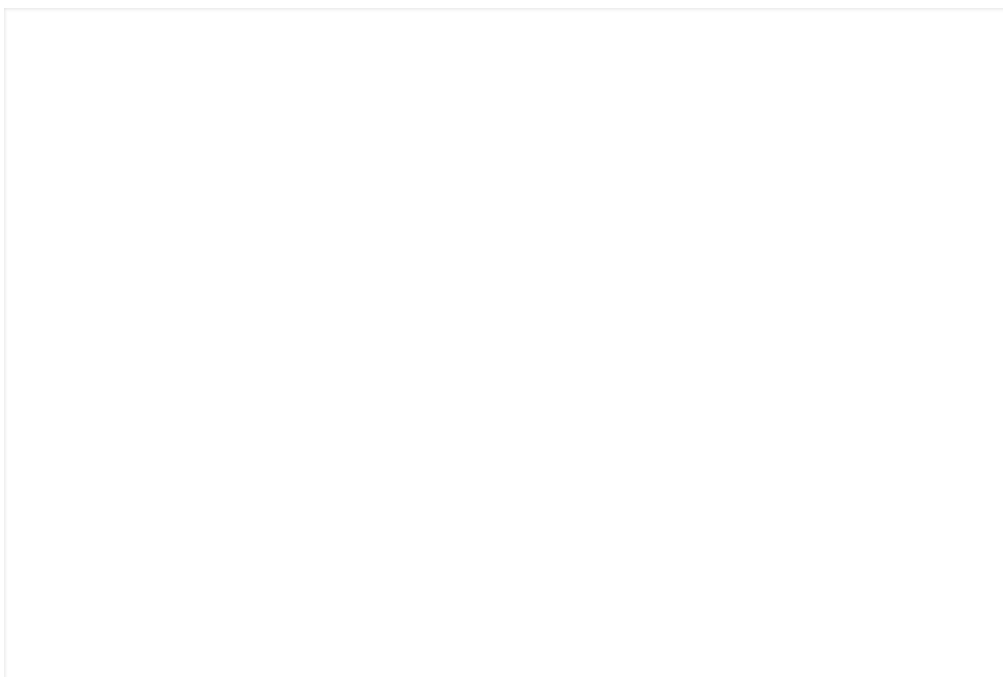
Soils

Shiitake mushroom production has been identified as a suitable forest farming practice due to the availability of maple wood, sufficient labor capacity, and adequate space for a laying yard on the property. The location of the laying yard, indicated by a red square on the map, was selected partly because of its access to water and roads. Road access is crucial for the efficient transportation of logs into the laying yard after inoculation or when the logs are no longer productive. Additionally, water access is important for maintaining moist conditions and provides the option to shock the logs, a process that encourages shiitake fruiting. This site is also relatively flat compared to other areas of the farm, making it easy to stack the logs in cribs.



Canopy Cover

Numerous mushroom species, particularly shiitake mushrooms, flourish in environments that receive 75% shade or greater (Kalenius 2022). For optimal cultivation, stands of coniferous trees, such as hemlock, are highly valued for laying mushroom yards. These trees create a lush, dense canopy that shields the ground from direct sunlight year-round, maintaining a cool and moist microclimate essential for mushroom growth. Additionally, the thick branches of hemlock provide a natural windbreak, protecting delicate mushroom crops from harsh weather conditions and ensuring a stable environment for productive cultivation.



Practice Description

This farm chose shiitake mushroom farming due to the site's conditions and resources, as well as its alignment with the farmers' objectives. This approach allows the farmers to diversify their current enterprises while producing high-quality medicinal and gourmet products that can be sold in local markets. Furthermore, shiitake cultivation leverages the abundant natural resources of the surrounding forest; in addition to oak, which is commonly used, sugar maple is recognized as the second-best wood for inoculating shiitake mushrooms. This farm was able to positively increase land intensification in a stand that is typically used for timber production, a single function enterprise.

(Right) Crib staking is a method of laying the inoculated logs during the "spawn run," or while the mycelium colonizes the wood of the log. This arrangement allows for some air flow between logs while optimizing space.



(Above) Irrigation is set up using a sprinkler to water logs consistently throughout the season.

(Left) Fungi need moisture in the wood to break it down, so it's important to water the logs if it doesn't rain. After you inoculate the logs, make sure they get at least one inch of water each week when there's no rain. Sprinklers work well for this.

Good water management is crucial during the first growing season while the spawn is becoming established. By the end of the season, you usually won't need to water anymore, and letting the logs dry out a bit can help increase mushroom production.



Piermont, NH

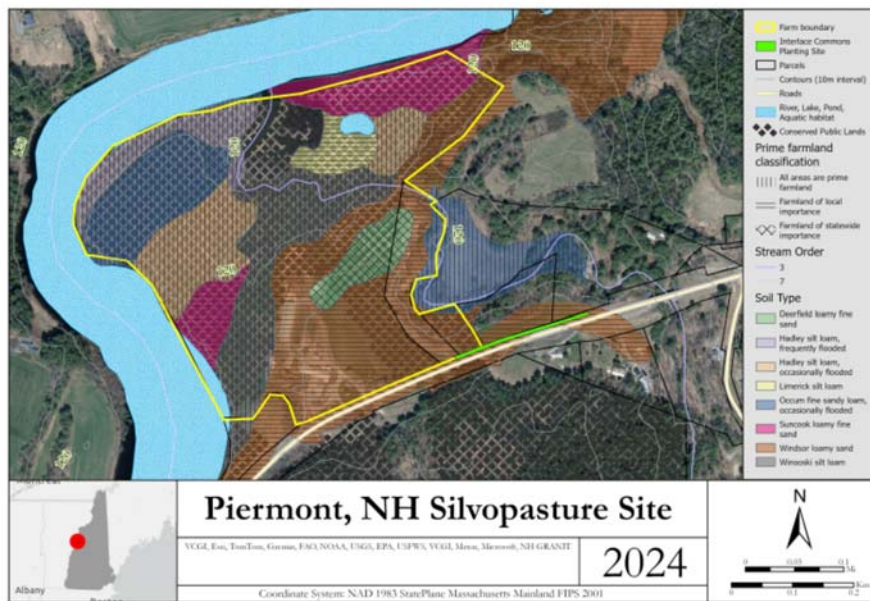
Silvopasture

The farm in Piermont, New Hampshire, raises beef, pork, poultry, and dairy cows. In recent years, they have strategically shifted to on-farm cheese production and direct-to-consumer sales of their products locally. This change has allowed them to diversify their operations, focus on sustainable pasture management, and offer educational opportunities to the community. They have identified rising temperatures and longer periods of drought as significant challenges and are working to mitigate the effects of climate change on their livestock.

Challenges

Opportunities

Objectives



Maps

Soils

This farm is located along a bend in the Connecticut River. It has different types of sandy and silt loam soil, which are great for growing various crops. The roadside planting area, marked by the green line on the site map, has several uses. The planting demonstrates how to increase density with single row planting in confined spaces. It plays a crucial role in mitigating the effects of rising temperatures and prolonged drought conditions by providing much-needed shade for farm livestock.



Planting Plan & Schedule

In the area where this planting was implemented, hay is produced in the spring and grazed by bovines in the summer. The primary goal of the tree planting is to provide an even distribution of shade across the paddock for the cattle during the summer grazing season. The Bitternut hickory (*Carya cordiformis*) creates a dappled shade due to its shape and leaf structure, making it ideal for silvopasture. Additionally, the interplanted mulberry (*Morus* sp.) is palatable and rich in protein, amino acids, and minerals. Mulberry remains a reliable feed source during drought periods when grasses and forbs have stopped growing.



Hartland, VT

Alley Cropping

The farm in Hartland operates as a micro-dairy and vegetable produce business. It follows organic and regenerative principles to promote soil health, aiming to restore the land while providing healthy food for the community and sustainable incomes for the farmer-owners and their employees. The farm serves as a learning and teaching center.

Challenges

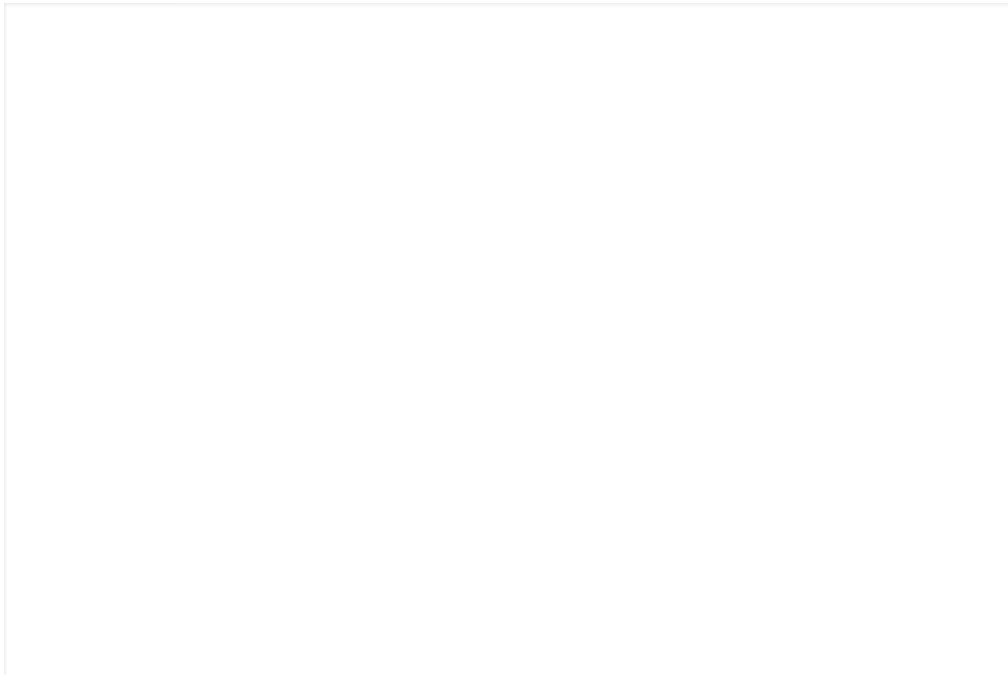
- Excessively drained soils prone to drought
- The main economic driver of the farm business is milk sales
- The margins of running a dairy is thin with fixed costs continue to rise
- The lack of understanding whether there is marketability for produce grown in an agroforestry system

Opportunities

- The soil type allows the farmer to be on the fields early in the season with less risk of compacting the soil and is more forgiving of disturbance in a wet year
- Adding perennial fruit and nut crops expands the range of fresh, storage, and value-added produce the farm can make available to the local community
- Perennial crops buffer the farm from disrupted weather patterns due to climate change
- The co-housing community and farm customers are supportive and enthusiastic about current development that include innovative practices

Objectives

- Increase farm resilience
- Develop the farm as a teaching and learning center
- Increase local sales through promotion of regenerative farming.



Mapping

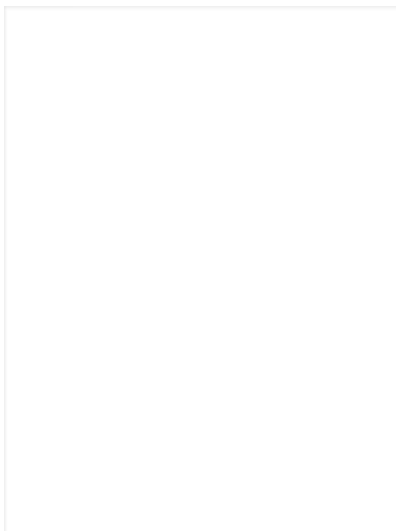
Site Map

Indicated by the pink bordered polygon on the southeastern portion of this map, the site identified for alley cropping is a flat area of well-draining sandy loam. These conditions have made it an ideal market garden location in the past, though unpredictability of rainfall has made it increasingly vulnerable to drought. The farm sought out designing a system with perennial tree crops in order to increase resilience to drought and meet shifts in both labor capacity and production goals.



Planting Plan & Plant Schedule

This alley cropping system was designed with rows of chestnut (*Castanea sativa*), elderberry (*Sambucus spp.*), and peach (*Prunus persica*), as these are marketable crops that are intended to diversify farm income. The introduction of perennial rows will help with water retention and soil health in the field, as well as increasing efficiency and reducing field inputs in the long-term. Crops grown in the alleys will include corn and squash in rotation with cover crops. Considerations of alley width and row spacing included the tools and machinery that would be used to work these alley crops, including both tractor and horse-driven implements.



(Left) The alley between rows of chestnuts with cover crops growing within the alleys



Tunbridge, VT

Silvopasture

The farm in Tunbridge specializes in producing organic, grass-fed beef, lamb, and pastured pork for CSA shares and local markets. Their mission is to raise high-quality meat and other value-added products while also regenerating the health of the land. Like many areas in the Northeast, this region has experienced an increase in extreme weather events and has been significantly affected by drought and flooding. These challenges have motivated the farm to implement silvopastoral systems.

Challenges

- Over grazed pastures with significant compaction
- Much of the land is steep and not accessible with equipment
- Cashflow is a challenge making long term investments challenging.

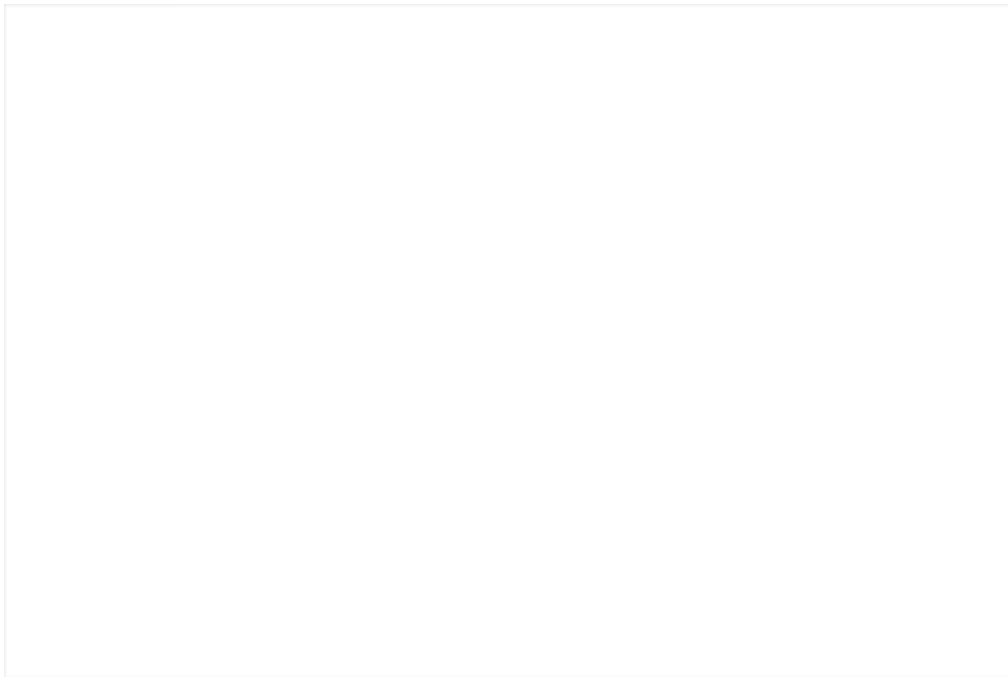
Opportunities

- Access to technical service providers that can assist the farm in improve pasture management practices
- Potential for multiple income streams

Objective

- Buffer pastures to extreme weather events including drought and heavy participation
- Establish shade (and shelter) for livestock
- Increase the overall biodiversity of this land
- Introduce additional food source for livestock through fodder

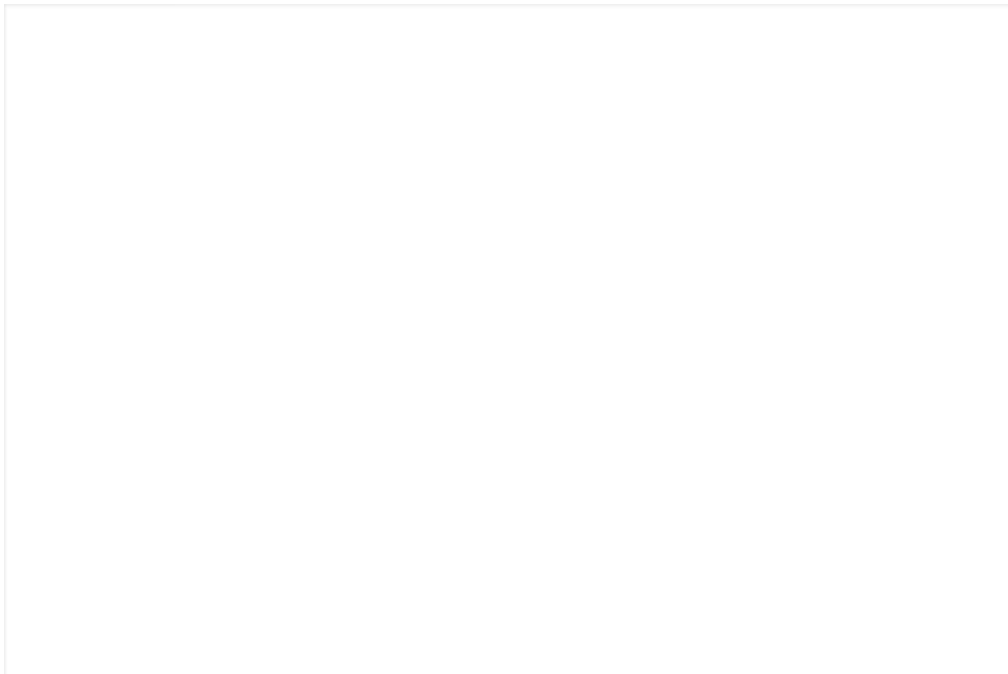
including those that are anti-parasitic and medicinal



Mapping

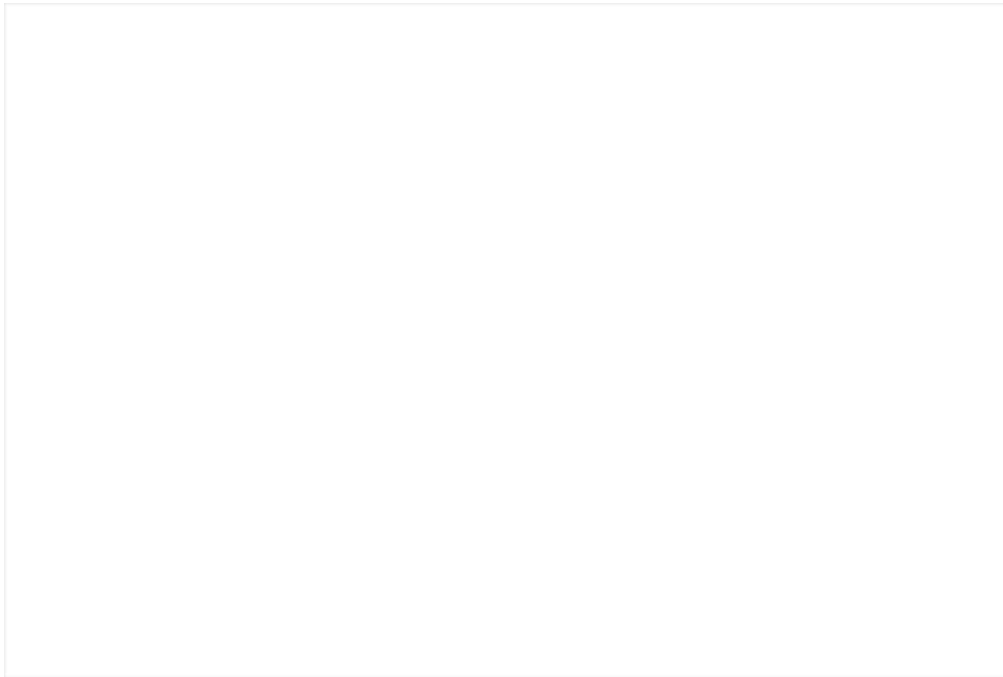
Site Map

Indicated by the white outline on the western end of the farm property, the site that was selected for silvopasture planting is a low, flat field compared to the rest of the pastured areas. It is also a relatively accessible area for farm equipment and maintenance, making it an approachable site for tree establishment.



Flooding Frequency

The site location has seen an increase in flooding in recent years as heavy rainfall events become more common. As shown on this map, the river running along the western end of the farm boundary has the potential to flood into the field. Coupled with the well-draining fine sandy loam soils, this site is particularly vulnerable to both flooding and drought conditions. Planting tree systems in this field for resilience to extreme weather events was a major motivating factor cited by the farmer. Species selection for the silvopasture system was made according to this flooding potential.

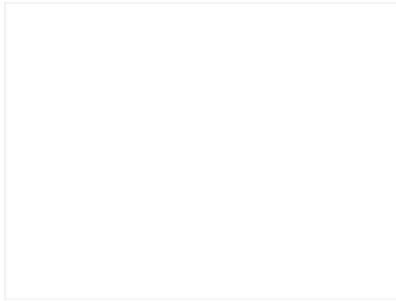


Planting Plan & Plant Schedule

This silvopastoral system was designed in order to provide a landscape that is comfortable for livestock in a wider range of conditions, reduce the use of shade structures in fields, and increase biodiversity and plant density. This planting includes rows of black walnut (*Juglans nigra*) and poplar (*Populus sp.*), chosen for the site conditions, ability to cast dappled shade, and poplar's potential as a fodder species.

Tree rows were planted 80' on center to allow for paddock sizing that is appropriate for both sheep and cattle, which are rotated through this field. Fencing excludes the livestock while trees are being established.

Rows of black walnut and poplar trees have been planted across the pasture, each protected by white tree tubes. Currently sheep are seeking cooling shelter provided by a pop-up tent in the newly planted field. The dappled light filtered through the black walnut and poplar trees will eventually

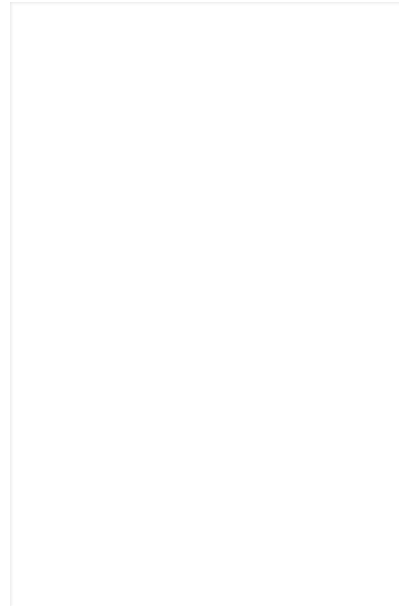


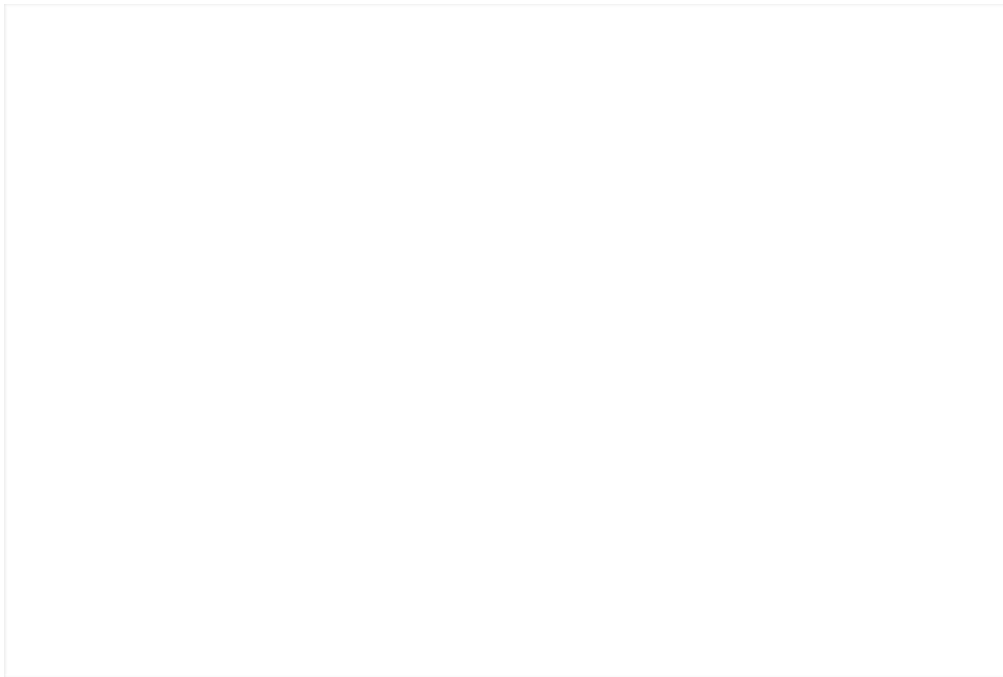
provide shade for the livestock, eliminating the need to relocate structures like tents. The fast-growing poplar trees have already exceeded the height of the tree tubes in their first season.

(Above) Rows of black walnut and poplar are planted across pasture, protected by white tree tubes.

Sheep seek shade under pop-up tents in the planted field. Dappled light cast by black walnut and poplar will eventually provide relief for livestock without the need to move structures like these.

The two main reasons this farm include trees in pastures is to improve production efficiency including increased forage yields and quality and the provision of cooling shade to help reduce heat stress.

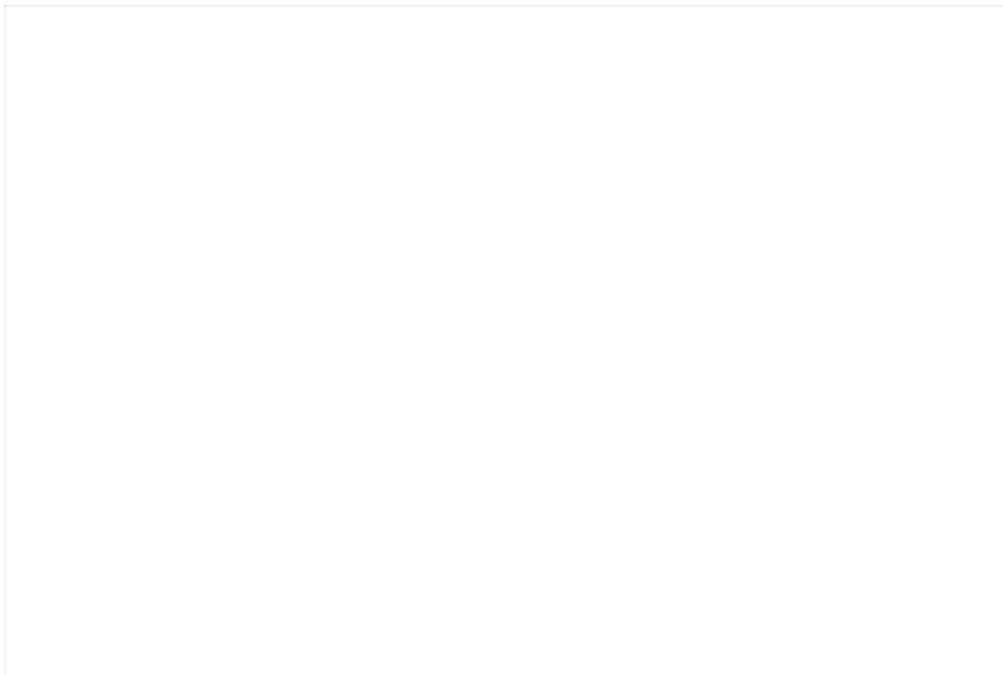




Weathersfield, VT

Forest Farming

The farm in Weathersfield, VT raises beef cattle and is working to integrate the forested landscape as a livelihood and community resource. The farmers aim to diversify income through various forest farming enterprises while conducting responsible forest management.



Mapping

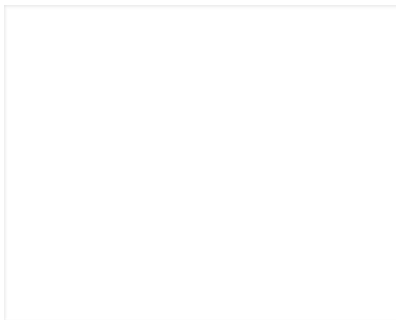
Site Map

The farm aims to do both mushroom and forest botanical production at this site, due to the forest management goals of the farmer as well as the capacity of forested land. Stands of hemlock, as well as stands of deciduous trees like beech and sugar maple, exist across variously sloped land that create a variety of conditions fitting for both forest farming practices.



Canopy Cover

Canopy cover is one of many factors that help determine whether a location is fitting for forest farming. As demonstrated on this map, the forested areas of this farm vary in percent canopy cover. Mushroom farming is undertaken under the dense, nearly 100% canopy cover of hemlock trees. Wild-simulated forest botanical plantings are established in areas with less canopy cover, with some additional canopy management done to create ideal light conditions.



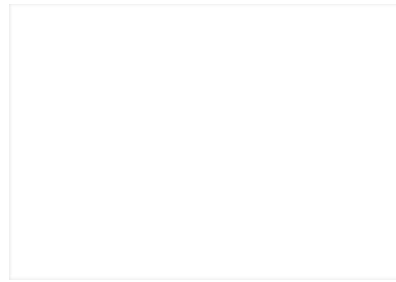
(Left) Shiitake plug spawn. Inoculants are essential for cultivating various types of mushrooms and come in different forms, each with its unique characteristics and uses. One common type is plug spawn, which consists of small wooden dowels inoculated with mushroom mycelium. This type of spawn is commonly used for inoculating logs to cultivate species like shiitake and

oyster mushrooms. It is easy to use and offers a high success rate when inserted into pre-drilled holes in the logs.

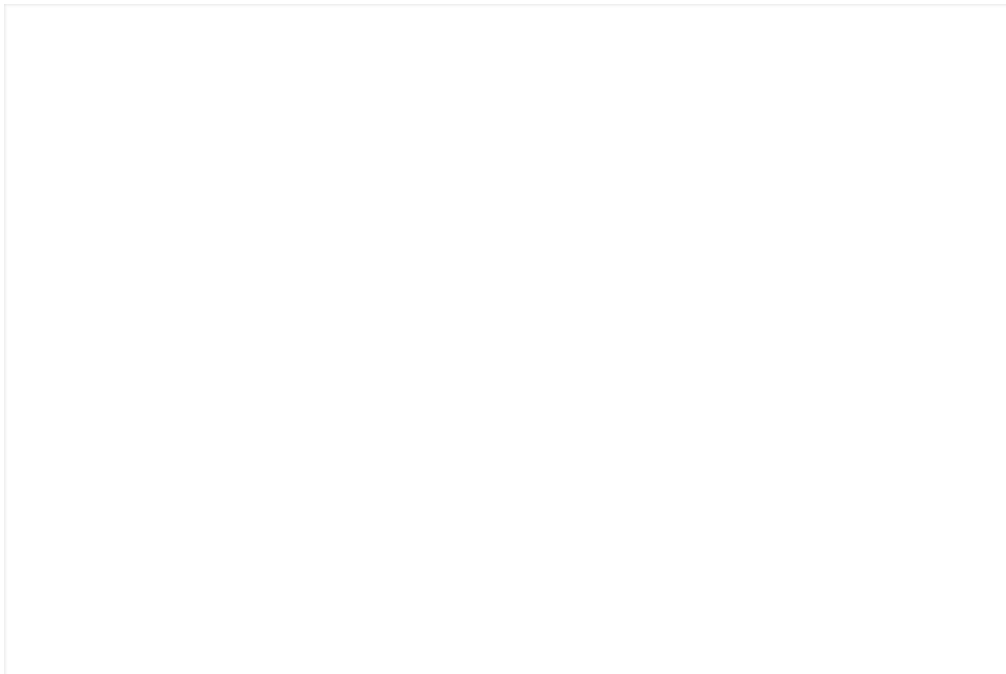
(Right) Wax plays a crucial role in the process of inoculating logs, as it effectively seals the holes where the plug spawn is

inserted. This sealing not only prevents any potential contaminants from infiltrating the log but also helps to lock in moisture, creating an ideal environment for the spawn to thrive.

A double boiler ensured that the wax remained in a melted state, allowing for an easy and effective application. This setup provided the necessary heat control, preventing the wax from burning while ensuring it was ready for use when it was time to seal the inoculated logs.



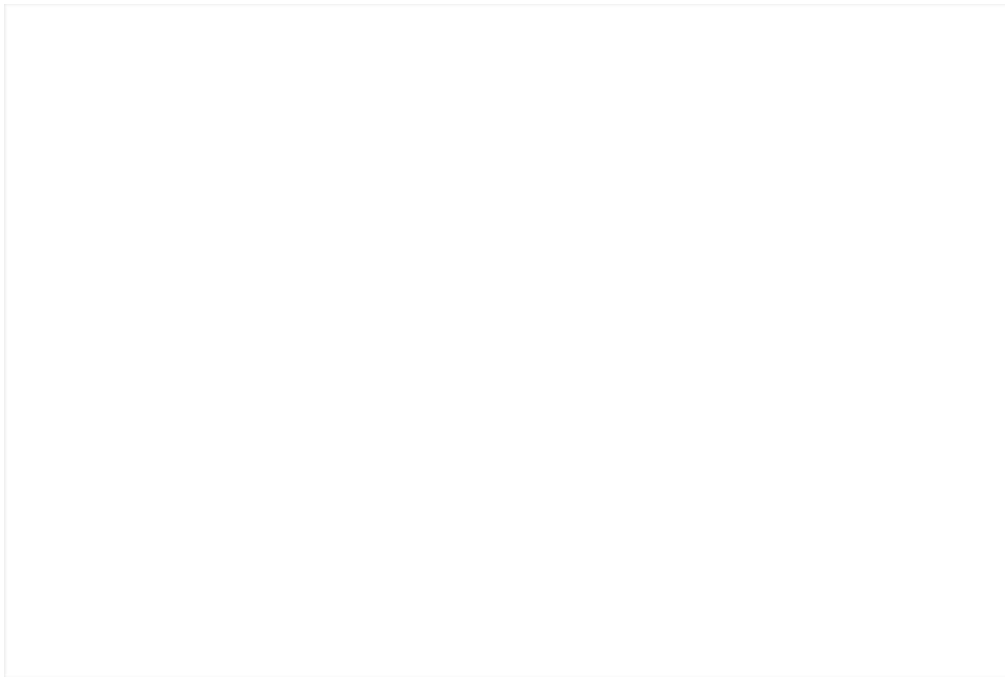
**SARE Partnership Grant: The Creation of Two Alley Cropping
Demonstration Sites as Cases Studies on a Massachusetts and
Vermont Farms**



Amherst, MA

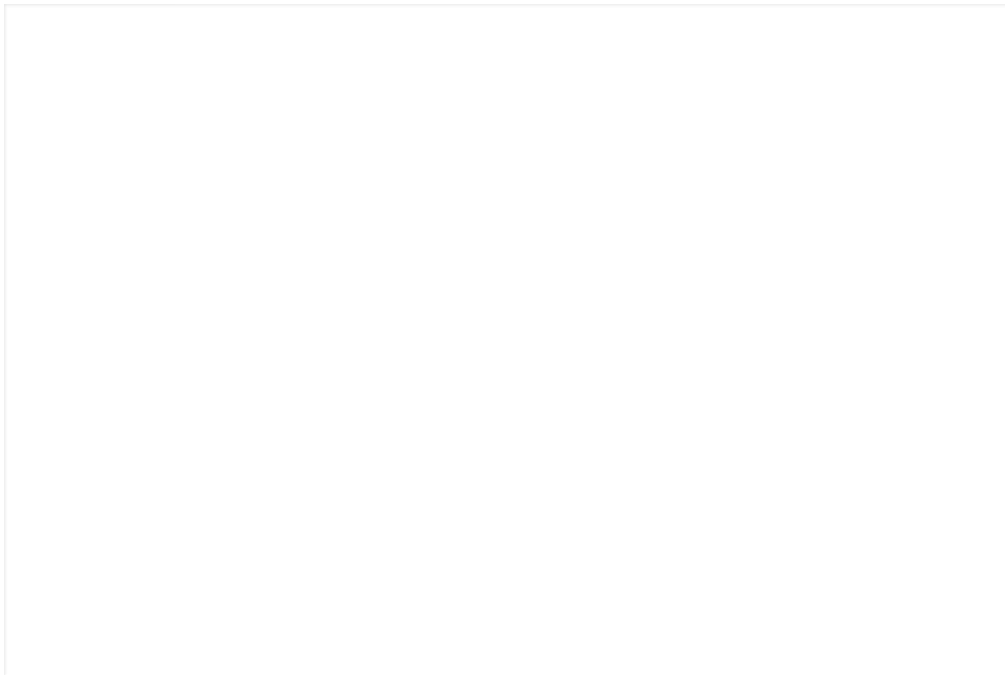
Alley Cropping

The land located in Amherst, Massachusetts, an agricultural learning center was established to serve as a hands-on classroom where students can learn about farming as well as the horticultural, nursery, and landscape industries. The Carbon Farming Initiative offers demonstrations and training for students in agroecology, focusing on climate change mitigation and adaptation.



Mapping

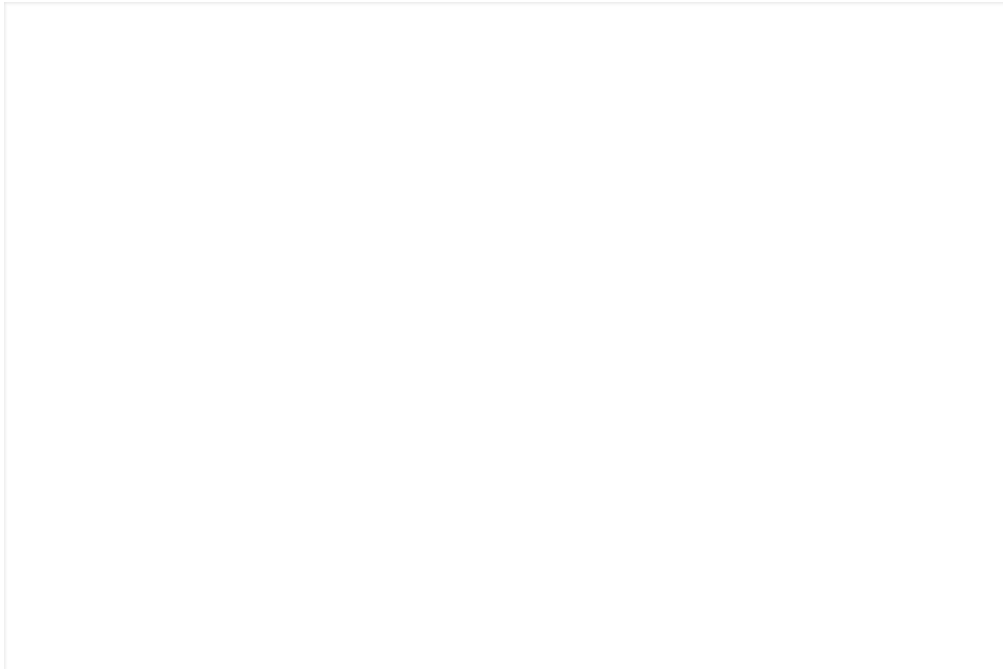
Located on prime farmland with moist sandy outwash, the land above the developed area experiences soil erosion and has a seasonal high water table.



The site is characterized by loamy soils over sandy deposits from glacial rivers. The average annual rainfall ranges from 42 to 46 inches.



Sudbury soils in this location experience a seasonal high water table and period of storage deficits starting in June. That farm plans to irrigate the crops given this information and changing climatic conditions wherein droughts are becoming more common and are sustained over longer periods of time.



Land-use History

This land was originally stewarded by the Pocumtuc and Nipmuc tribes until they were forced westward by colonizers. The hose for this project started as an agricultural school in 1863. The Agricultural Learning Center is now located on the former site of the Dakin and Wysocki family farms. Current

programming at the center provides students with skills in organic farming, urban farming, native pollinator habitat conservation, social justice, agronomic crop production, and animal husbandry.

What changes..

What changes would you like to see, if any? What drives those changes? In the context of your current farming enterprise(s), how do you envision integrating trees with crops or trees with animals? Lastly, what motivates you to care for your agricultural landscape?

"Our overarching goal is to establish a functional and experimental farm where students can safely train for the agroforestry industry and learn from their experiences, even if it means making mistakes. Agroforestry will be a core component of our agricultural operations and will not be viewed as a separate or experimental initiative. Our work will promote an interdisciplinary approach through collaboration across disciplines and in partnership with scientists and others within the University and the broader community. " -LD

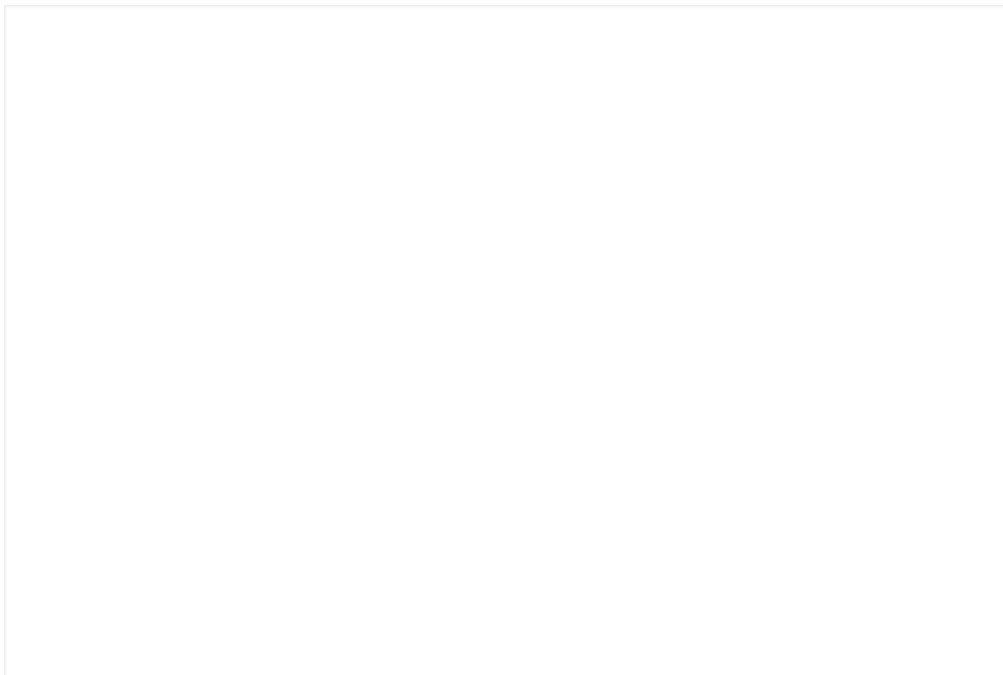
The farm communicated that the primary goal of the project is to enhance biophysical benefits by protecting and improving ecosystems to build resilience against environmental challenges. They intend to focus on strategies that prevent soil erosion and promote water infiltration while creating a pollinator-friendly landscape that aligns with the State Apiary.

Their ongoing aim, particularly within the alley cropping project, is to inspire the community with tangible solutions to ecological and societal issues while also addressing past traumas and restoring traditional land use practices. Additionally, the project participant mentioned engaging in policy discussions with stakeholders, including agricultural agencies, the USDA, academic institutions, state representatives, and the Forestry Committee, to help drive meaningful change for our community and the environment.

Despite these challenges, there are significant opportunities for growth. The organization can explore partnerships with the larger community, including Big Y, which would provide access to an unlimited market. The ALC Director is open to experimentation, creating a safe space for projects without immediate profit. There is an emerging interest in agroforestry, and the potential for greater collaboration with innovative farmers exists, including possibilities for tool sharing, education, events, and policy changes.



The **field preparation** took place in the fall of 2022, followed by secondary tillage in the spring of 2023. Field measurements were conducted, and a north-south orientation was laid out by hand.

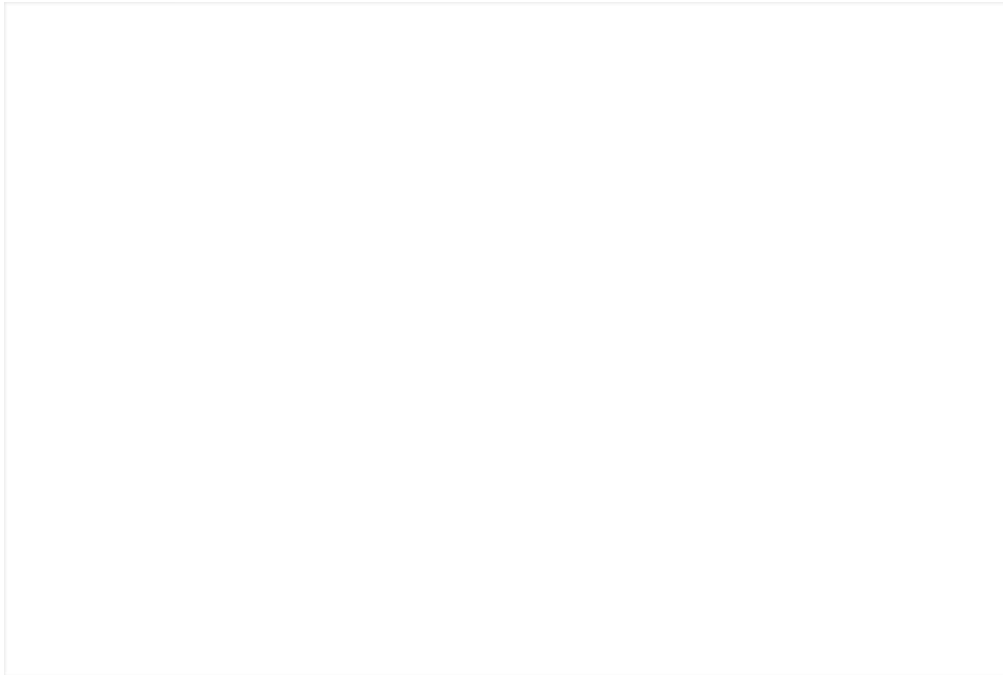


Challenges & Opportunities

The project faces several challenges, including inconsistent student involvement and a lack of succession planning. Erosion is causing some crops to wash out. Additionally, ALC projects are self-funded, so there is no dedicated budget available. There is limited college support with no designated personnel for maintenance or fundraising.

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Eighty-six stems were installed across one half acre. **The species included:**

Pyrus pyrifolia, *Sambucus canadensis*, and *Lonicera caerulea* were planted. The trees were installed fully feathered, while the shrubs were planted in one-gallon pots. These particular species were chosen to enhance the variety of crops sold at the local farmer's market and retail outlets. *Sambucus canadensis* offers opportunities for creating value-added products.

Sambucus canadensis offers opportunities for creating value-added products. Retail prices for organic frozen berries range from \$3.00 to \$4.00 per pound. Fourteen-ounce bottles of elderberry syrup sell for \$10.00 to \$15.00 at retail. This species is considered versatile, as both the flowers and berries can be used to produce a variety of products.

Lonicera caerulea, commonly known as honeyberry, is a relatively new berry in the US market that has experienced significant improvements through breeding. These advancements have led to market-ready berries that are comparable to *Vaccinium corymbosum*, or highbush blueberry. One of the advantages of cultivating this crop is that there are few growers, making it a novel option for consumers.

Additionally, honeyberry is an early fruiting species that does not face challenges with Spotted Wing Drosophila, a common pest affecting other fruits. Honeyberry receives \$8.00 to \$10.00 a pound for organic frozen berries.

Pyrus pyrifolia is an easy-to-grow type of pear with few disease or pest management issues, which is, in part, why the farm chose this species. It's in high demand in retail markets, making it an excellent choice for the farm to provide during the late summer and fall farmer's market and CSA—\$2.00 to \$4.00 or \$4.50 per pound at retail.



Warren, VT

Alley Cropping

The farm located in Warren, Vermont is deeply rooted in the community. They are exploring how annual and perennial cropping systems can be integrated into the agricultural landscape. They are committed to creating a healthy, robust ecosystem including social frameworks that provide right livelihoods for the land stewards farmers while nourishing, educating, and bringing joy to the broader community.

The farm aims to:

1. Be an inclusive place for gathering and education;
2. Feed the community;
3. Tend and share plant inheritances;
4. Measure, monitor, and modify our impacts as our journey unfolds, and
5. Be profitable

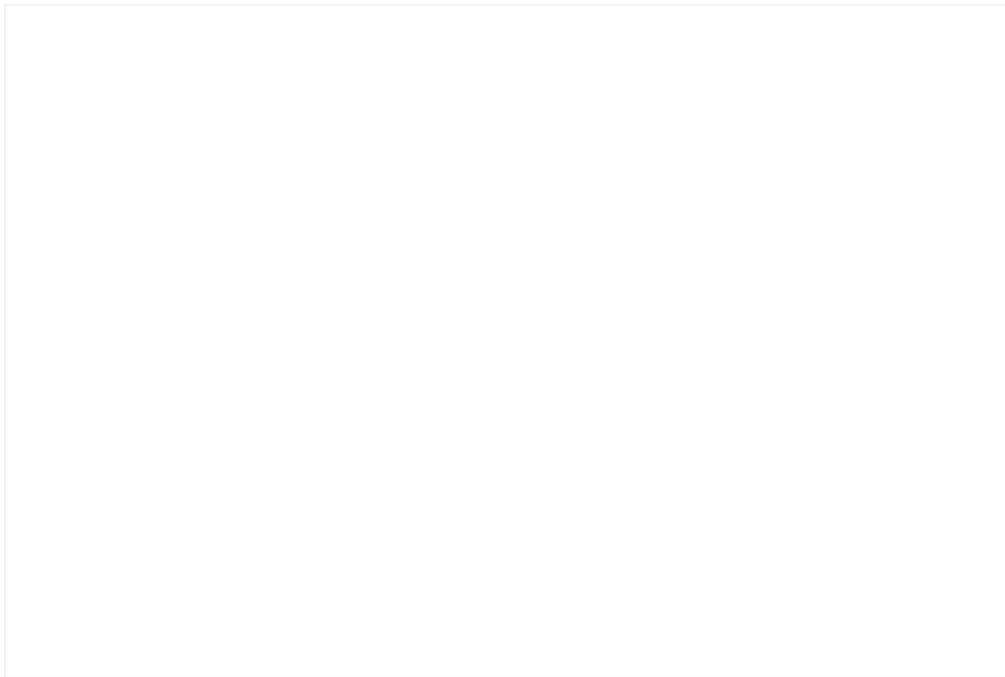


Mapping

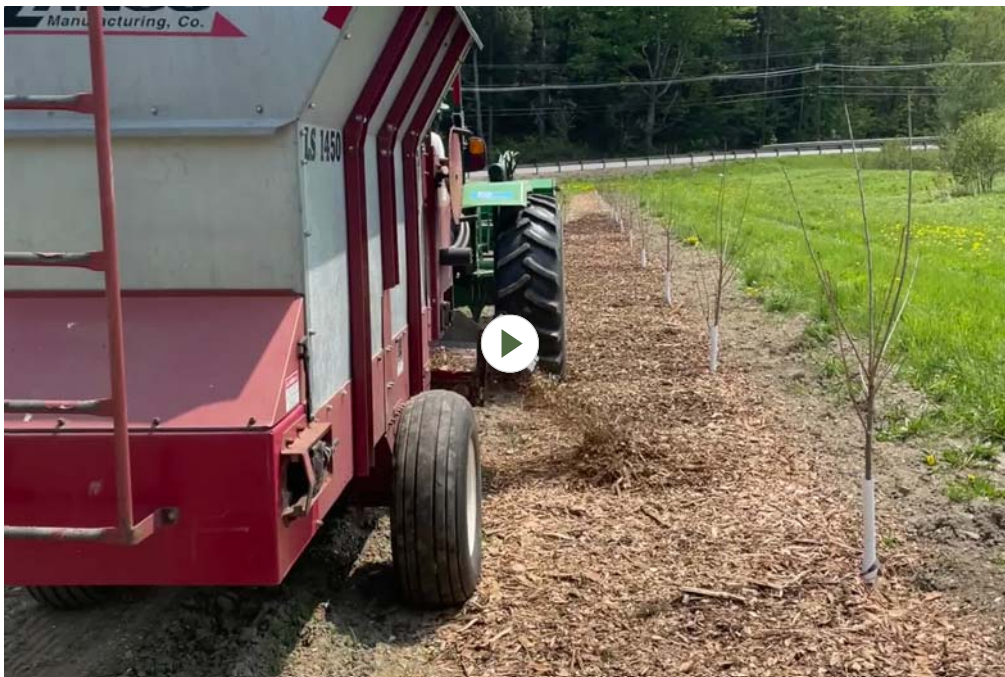
The farm is located adjacent to the Mad River, which drains north and eventually enters the Winooski River. This area is classified as a Broad Floodplain Riparian Complex with excessively well-drained soils.

To the due east of the property, there is a 90-acre catchment area that drains into the property through an underground culvert connected to the Mad River. In the spring of 2023, the culvert's infrastructure exceeded its capacity, resulting in the flooding of a small portion of the land adjacent to the alley cropping demonstration field.

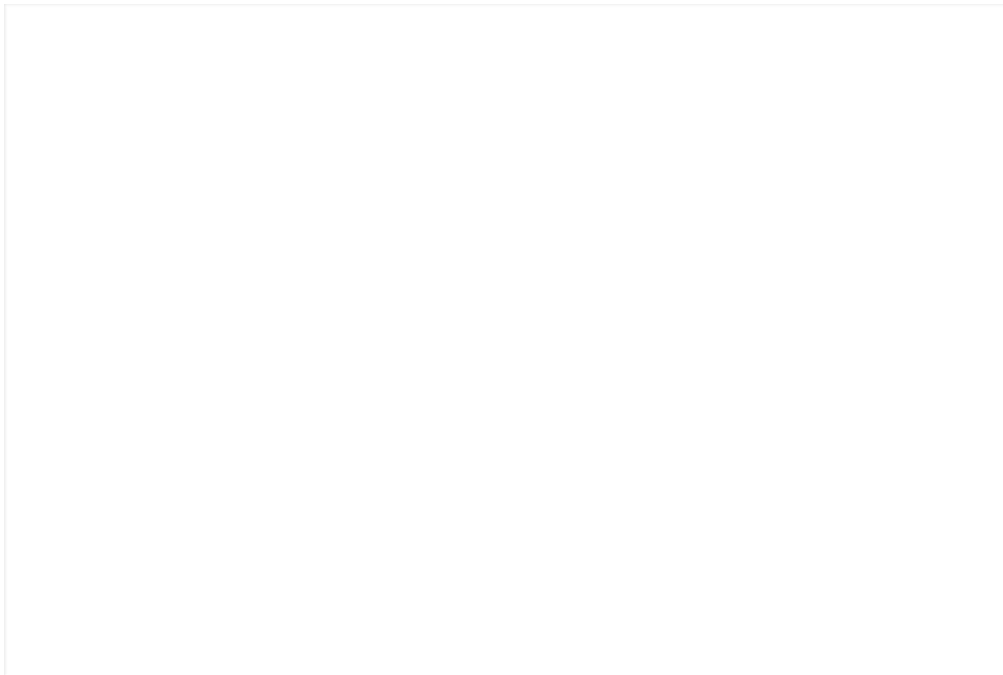
The farm experiences approximately 42 inches of rainfall seasonal rainfall inconsistently across the year. The farm is experiencing short, intense precipitation events with longer periods of drought.



The **field preparation** took place in fall 2022, followed by secondary tillage in spring 2023. Field measurements were conducted, and an east-west orientation was laid out by hand.

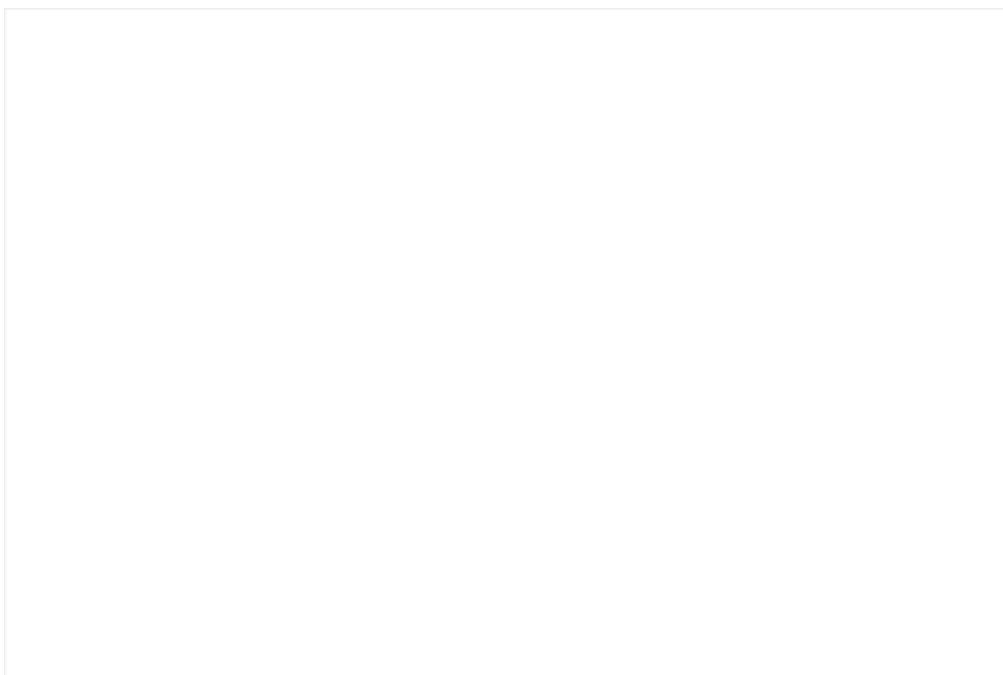


To work smarter, not harder, a side mulcher was used to apply wood chips to each row of trees and



Two hundred and ten stems were installed across one acre. **The species included:**

Pyrus, Prunus persica, Prunus creases, Ribes nigrum, Ribes rubrum, and Ribes Uva crisa. The tree species were installed as fully-feathered trees, while the shrubs were graded at installation between twenty-four and thirty-six inches. These species were specifically chosen because of their current demand in the retail and wholesale markets and could be included as a part of a weekly CSA program. Currants both black and red as well as gooseberries sell for \$5-\$8 per pint, which translates to approximately \$7.50-\$12.00 per pound. Peaches and cherries sell into retail markets between \$2.20 and \$9.51 per pound.



Interplanted shrubs (*Ribes nigrum*, *Ribes rubrum*, and *Ribes uva-crispa*) enhance structural and species diversity, attracting fauna to the area throughout the growing season. The shrubs partition resources in a different layer of the soil strata separate from the trees root system, creating a mutualistic relationship with the tree while also creating a root barrier between the tree and the alley crop reducing competition.

Credits and Cited Sources

GIS Layer Sources: ESRI, TomTom, Garmin, NOAA, USGS, EPA, USFWS, Maxar, Microsoft, Esri Community Maps Contributors, MassGIS, OpenStreetMap, SafeGraph, GeoTechnologies, Inc, METI/NASA, NPS, US Census Bureau, USDA

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