



They Keep Bees

*Adding Trees for Ecological
and Economic Resilience*

March 2026

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Adding Trees for Ecological and Economic Resilience

Featured Practice

Alley Cropping



Key Themes

Soil Health
Honeybee Forage
Expanding Product Offerings

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This case study is part of a series highlighting farms across the Northeast implementing agroforestry as a strategy for building resilience. All farmers featured were participants in the Climate Adaptation and Mitigation Fellowship (CAMF). Discover more agroforestry case studies like this on their website: www.adaptationfellows.net

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Farm Overview

They Keep Bees (TKB) is an apiary based in Montague, Massachusetts, co-owned and operated by Ang Roell and Bi Kline. They manage 300 hives at their home farm and on nearby properties in western MA. They also have nut and small fruit crops planted which they anticipate will come into production starting in 2026. Ang shared their experiences and perspectives to inform this case study.

Location	Montague, MA	Primary Product	Honeybees (Queens)
Acres in Agroforestry	2.5 Acres	Secondary Products	Honey, beeswax, and beeswax products



Ang Roell, photo used with permission.

Background

While working as an educator in Boston, Ang began keeping bees at a community orchard. From there, Ang became more involved in urban farming and beekeeping, and ultimately began working in bee genetics. Bi also has a background in education and farming, growing salad greens and mushrooms for market. In 2019, Ang and Bi launched They Keep Bees.

They own the property, which abuts the Connecticut River, and has sandy, acidic soil. Previous owners used the fields and woodlots as an evergreen nursery. There are still some areas of overgrown evergreens such as Christmas trees and arborvitae throughout the property. Evidence of how these nursery plants were harvested remain as well. Entire root balls were removed, which left large divots in the field and depleted the soil.

Ang continues to work off-farm as a strategy and organizational development consultant for nonprofits and government, especially during the slower winter season. Ang also continues to serve as an educator at the farm, offering workshops on sustainable beekeeping and raising queens.

Markets

Ang and Bi sell bees, honey, beeswax, and beeswax products primarily through an online point of sale. They also sell wholesale to herbalists and directly to consumers at occasional makers' markets.

As of 2025, Ang and Bi have not yet finalized a marketing plan for their upcoming agroforestry products. As fruit and nut crops come into production, Ang expects that they will likely sell these new products wholesale to avoid needing to direct market additional products themselves. Direct marketing can lead to a higher per unit price, but does require time, planning, and resources.¹

Weather Risks & Impacts

Ang sees changes in weather patterns that are affecting the region and the farm. Often this has been related to rainfall— not enough, or too much. Given the sandy soils on their farm, Ang and Bi view periods of drought as more problematic. Drought reduces the amount of nectar available for the bees to forage. It also brings management challenges. This includes more manual watering of crops and coping with certain pests and disease.

“ I think the longer periods of drought are synonymous with pest pressure. We see more deer. We see more bears looking for food, being more brazen because they're hungry so they're operating from a different decision-making paradigm. [There is] more insect pressure, and then stress on the bees, leading to nutritional deficiency, which leads to disease expression, which leads to loss of hives.

Ang Roell, Farmer/Owner

Bees reduce their activity during the winter, but still go out on cleansing flights to dispose of waste that would otherwise build up in the hive and potentially lead to disease issues. While too few cleansing flights are problematic, so are too many—this can deplete resources and lead to weaker hives.² Temperature affects whether bees go out on these cleansing flights, and how often. Ang has observed changes to winter bee behavior, which they attribute to irregularities in weather patterns such as long periods of deep cold. Ang and Bi are experimenting with storing hives in specialized containers as one potential adaptation to this problem. This could be a promising solution; however, storing bees will require a new management approach and rhythm for the farm.

The Northeast U.S. has experienced multiple notable drought events in recent years. In the Fall of 2025, nearly the entire region (99.97%) experienced Abnormally Dry conditions or drought, with roughly one-third of the region experiencing Severe or Extreme Drought.³



Ang Roell discusses the challenges and opportunities of using specialized containers for overwintering honeybee hives in the Northeast. Photo by Kate Holcomb, USDA Northeast Climate Hub

In addition to these specific weather challenges, the farm is impacted generally by the increasing unpredictability of weather. It is difficult to plan efficiently in the face of uncertainty. *Which months will be dry? Will there be an extreme rainfall event? Will there be a late freeze?* This adds additional labor and stress for Ang and Bi.

“You’re constantly pivoting in a way that doesn’t allow you to reflect, digest, and make a cohesive plan. Obviously so much of farming is pivoting, and having 375 backup plans, *right?* But this is, to me, getting to a point that it's emotionally and psychologically exhausting.”

Ang Roell, Farmer/Owner

Average temperatures in Franklin County have risen 2°F since 1970; the winter average has increased 4-5°F. Extreme rain events have increased 123% from 1950-2021. Looking forward, temperatures, precipitation, and large storms are all projected to rise.⁴ Projections also suggest that short-term droughts will increase in frequency alongside rising precipitation trends.⁵

For the past seven years, TKB migrated the business during the winter months, when bees in Massachusetts do not have access to forage and are not reproducing. Ang and Bi would travel with their bees to North Carolina and Florida, which allowed them to keep the honeybees active and reproducing, generate more queens for sale, and improve upon their craft during the extended season. Although this approach helped TKB become financially viable, it has also exposed them to more risk from changing weather patterns and extreme weather events, specifically hurricanes.

In 2024, their North Carolina hives were wiped out by Hurricane Helene. Their travel to Florida was then delayed by Hurricane Milton. Although the Florida hives weren't directly hit, impacts from Milton affected availability of bee forage and other factors that led to a major decline in hive health. Ang and Bi were already in the process of analyzing the profitability of their Northeast business, with plans to cease migration in the future. The 2024 season pushed them to make the change sooner than planned.

Ang and Bi made the decision to no longer migrate. 2025 was the first year that the hives remained in Massachusetts year-round. Their 2024 experience informed not only the decision to stop migrating, but also emphasized the importance of preparation and adaptation on the home farm. Their strategy will shift to a more local focus, centered on Northeast-bred honeybee genetics, instrumental insemination, and genetic preservation.

“Fighting off all the post-hurricane impacts in Florida and being wiped out in North Carolina, it made us realize: *Now is the time.*”

Ang Roell, Farmer/Owner

Hurricane Helene hit the southern Appalachians on September 27, 2024, following a prolonged period of heavy rainfall. Some areas saw 20-30 inches of rainfall in four days. With saturated soils and already high stream and river levels, the hurricane's arrival brought catastrophic flooding and landslides, leading to widespread destruction. In the U.S., at least 176 direct deaths are attributed to Helene. In North Carolina, in addition to the loss of life, the hurricane damaged or destroyed homes, forests, and infrastructure, and is classified as western NC's most devastating natural disaster to date.⁶

Hurricane Milton had weakened from its full force by the time it made landfall in Florida on October 10, 2024. Although the storm did not directly hit the TKB bee yards, the area experienced hurricane-force wind gusts and heavy rains. Milton also caused an outbreak of at least 45 tornados in the area. The storm was responsible for 15 direct deaths and an estimated \$34.3 billion in damages.⁷

Hurricanes may not be caused by climate change, but models show that their intensity and capacity for damage are affected by warmer ocean temperatures, warmer air temperatures, and sea level rise. In the past 50 years, hurricanes have been intensifying more rapidly, causing heavier rainfall, and causing higher storm surges.^{8,9}

“ I saw what it was like to be unprepared
[for extreme weather]... it's happened [in North
Carolina] in a valley similar to the valley I live in
in Massachusetts. We're really ill-prepared regionally.
*What does it look like to build [resilience] in the
hyperlocal way, but then also across a region? ”*

Ang Roell, Farmer/Owner

Using Agroforestry

Agroforestry is the intentional integration of trees and shrubs into crop and animal farming systems to create environmental, economic, and social benefits. Alley cropping, an agroforestry system, involves planting agricultural or horticultural crops in alleys between rows of trees or woody shrubs. It enables producers to integrate multiple crops on the same acreage, which can improve whole farm yield. As trees and shrubs grow, they influence the light, rainfall, and nutrients available to the alley crops. Producers can manage these interactions for environmental and production benefits.

In 2023, Ang and Bi began to establish their alley cropping system by planting 2.5 acres of chestnut trees. They did a second round of planting in 2024, adding more trees in new rows and berries in some of the alleys.



The alley cropping system at the They Keep Bees home farm in Montague, Massachusetts. The tall tree tubes mark the rows of chestnut trees, and short tree tubes in between are home to the perennial alley crops of aronia and elderberry. Bee yards are situated on either side of the field, flanking the alley cropping system. Photo by Kate Holcomb, USDA Northeast Climate Hub.

Goals

The seed of the idea to try alley cropping at TKB came to Ang and Bi from a friend, who works as a land planner. He visited the farm, talked with Ang and Bi about the issues they faced as well as their long-term goals, and noted that there were already mature chestnut trees on the property that seemed to be growing and producing well with very little upkeep. The friend suggested chestnuts and agroforestry as a potential strategy, and provided guidance on how an alley cropping system could be laid out on their land. The idea seemed promising to Ang and Bi, and they dove into research and planning. In deciding to invest in agroforestry, Ang and Bi hope to accomplish several goals:

- ▶ Support the primary enterprise of beekeeping through honeybee forage production: Chestnuts, aronia, and elderberries produce nectar that is beneficial for honeybees.
- ▶ Expand product offerings to include nuts and fruit: Ultimately, they want to strengthen the financial position of the farm by extending the season of available products for their customers.
- ▶ Reduce risk from changing weather conditions: By improving soil health, the farm will be less susceptible to extreme weather events, such as drought or excess rainfall. Building soil fertility and incorporating perennials could help eliminate invasive grasses and restore a healthy ecosystem on the farm, minimizing risk of pests and disease.
- ▶ Start a conversation to expand their impact: The agroforestry planting at TKB can act as a teaching tool, engaging the wider community in discussion about tree species that are beneficial to humans, honeybees, and local ecosystems. Ang and Bi can also use their farm as an example and encourage other landowners to consider planting species that are beneficial to pollinators.

“There's a lot of strategy to it. It's like, ‘OK, *this is the big problem. How do we tackle it on this scale?*’ And then how do we use this [site-level] scale to expand, so that we can be nodes in a network?”

Ang Roell, Farmer/Owner

Design & Species Selection

When choosing a site to plant chestnuts, the three-acre field on the property was the clear place to start. This field was desirable because it was close to the house and already cleared of most large vegetation. It was not well suited for annual production because of pressure from invasive grasses, poor soil quality, and the “waviness” of the field’s topography (a result of the previous nursery operation’s harvesting practices). The sandy soil was susceptible to wind erosion during periods of drought, further degrading the soil quality. With an alley cropping system, Ang and Bi saw an opportunity to build soil organic matter, diversify their production and income, and increase honeybee forage on the property.

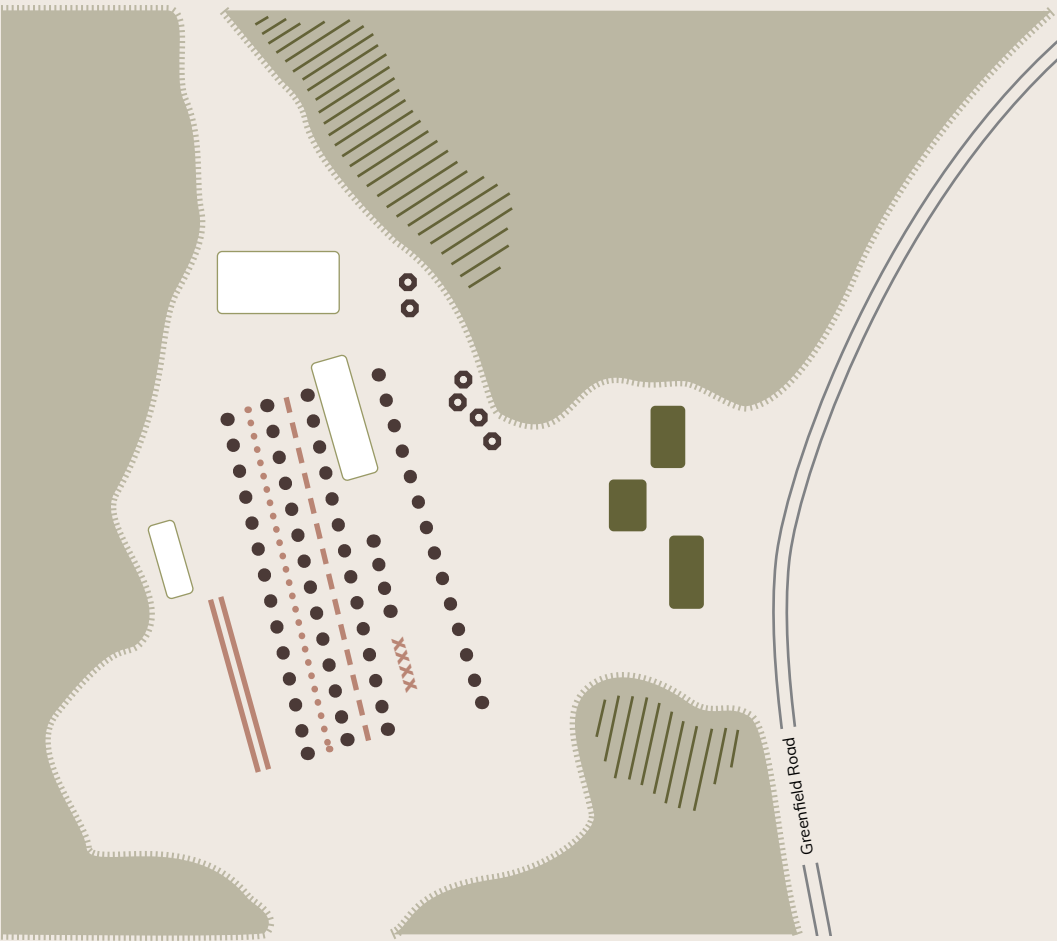
“Cover cropping and trying to plant annual crops in this field is not a reality that this land is ever going to be able to work with unless we're using massive amounts of chemicals. So— trees! And all of these are fruiting during a time where we have a little bit of a dearth [of nectar] in New England, mid to late July. So they create secondary nectar sources for the bees, which then also improves the pollination of those [trees].”

Ang Roell, Farmer/Owner

Chestnut tree rows on the farm are oriented north-south, with 30 feet between rows and 15 feet between trees in-row. Ultimately, approximately half the trees will be culled to achieve the long-term spacing of 30 feet between all trees. This wider spacing will allow greater nut production.¹⁰ There are four rows of chestnut trees, with each row about 325 feet long, planted in 2023. A second round of planting in 2024 added pawpaws and Asian pears to the tree rows, as well as one full row of aronia and one full row of elderberries in the alleys. There is more space to add additional tree rows as well as crops in the alleys.

The chestnut trees are American-Chinese hybrids, sourced from **Whistle Down Farm** in New York’s Hudson Valley. Ang provided information on the climate, soil profile, and goals of the farm, and Whistle Down provided a range of varieties that they thought could be successful at TKB. They also advised on planting methods and timing, as well as spacing for the 2023 planting. Technical assistance from **Interlace Commons** informed the design and species selection for this second planting.

Map of They Keep Bees



- | | | | |
|--|-------------------------|---|----------------------------|
|  | Bee Yards |  | Aronia |
|  | Farm buildings |  | Elderberry |
|  | Chestnut Trees |  | Hazelnuts |
|  | Existing Chestnut Trees |  | Legacy Evergreen Plantings |
|  | Pawpaw and Asian Pear |  | Forest |

Management

TKB is still in the early days of their alley cropping system. The ways in which they'll integrate the ongoing maintenance needs of their system into their workflow are still unclear. During the installation and initial establishment phases, Ang and Bi have been strategic with timing and approach. They do not want to overburden themselves, especially before their agroforestry system becomes an economic driver for the business.

Before planting, Ang and Bi went through several steps to prepare the fields. This included planting cover crops (such as sunflower, buckwheat, sorghum, rye, and clover) and liming the fields. Once they had designed the alley cropping system, they prepared the planting rows by sheet mulching: laying out layers of cardboard, compost, and wood chips to suppress weeds and add organic matter and nutrients to the soil.

They decided to plant the trees in the fall, rather than the spring. This was for two main reasons. First, they wanted to avoid manually watering as much as possible. Planting in the spring would have meant increased need for water during the hot summer months. Second, fall planting aligned better with their beekeeping schedule, which is very busy in the springtime. This choice worked out well; they did not experience issues with tree mortality in the winter following the fall planting.

The biggest labor draw while the trees are becoming established has been manual watering, which can take two to three hours each week. Additional maintenance tasks include mowing, monitoring the trees for signs of pests and disease, cleaning out tree tubes, repairing broken stakes, mulching, and pruning to establish a primary leader. In the future, once the chestnut trees are productive, harvest will take place in the fall.

When there is a big task to get done, Ang and Bi have found creative ways to call on “people-power” from the community. For example, they will host a workday and “open apiary”—they'll invite folks to come help with a basic task for a couple hours, and then offer a ninety-minute class about bees. This allows people to engage with both the bees and trees, and helps TKB accomplish big tasks. Although this community engagement approach has been helpful overall, it has occasionally led to some execution issues, such as people mistakenly removing variety labels when planting trees, or overcovering the tree root bulb.

Economics

In these early days, the alley cropping system at TKB is not generating any income. The goal is for berries, fruit, and nuts to become a financial driver in the future. They estimate that the alley crops may begin producing as soon as 2026, and that tree crops will follow at significant levels a few years later. (For guidance on how to accommodate the long time horizon of agroforestry in farm budgeting, see **Additional Resources**).

Co-benefits of TKB's alley cropping system may also positively affect their bottom line in the long-term. One example of an interaction or co-benefit is the provision of additional nectar, which can support a larger, healthier population of honeybees. Integrating trees and other perennials may also improve soil health and stability, which may buffer against weather risks such as high rainfall events.^{11, 12} As the trees develop, they will increase air and soil moisture, reduce nutrient runoff, provide shade, and reduce pests and disease, potentially reducing management and input requirements for the alley crops and buffering against drought and extreme precipitation events. In these ways, integrating agroforestry is part of a general effort at TKB to improve financial as well as ecological resilience, with the ultimate goal being the long-term viability of the farm.

Funding

In 2023, TKB received a New England Farmer Microgrant from **American Farmland Trust** to support their first chestnut planting. The \$4,000 grant covered the plant materials, tree tubes, stakes, and woodchips. Ang calculated that the farm put in about \$1,500 of labor to carry out the siting, planning, preparation, and planting of chestnut trees. The following year, support from **Interlace Commons** helped expand the alley cropping system at TKB by adding berries and fruit trees. They directly provided materials (plants, tree tubes, stakes, and plant mats) along with technical assistance (planning and design help, and two training and planting days on the farm).

Costs

Labor is the primary operating cost associated with the alley cropping system. Because the farm has sandy soils that dry out quickly and no permanent irrigation in place, most of this labor comes from manually watering the trees. Aside from watering, Ang says the care and maintenance costs are fairly low—about two or three days per season for spring, summer, and fall. Another significant demand on labor is mowing. However, Ang and Bi spread this cost across enterprises. This is part of the effort to control invasive grasses and repopulate the field with natives, and would be necessary regardless of the agroforestry planting.



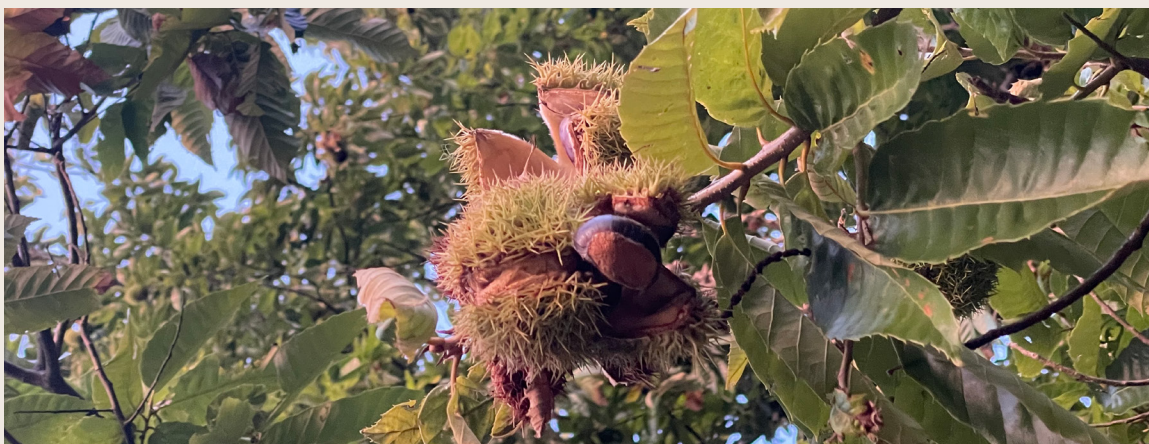
A hive at They Keep Bees. Photo by Ang Roell, used with permission.

Reflections

Looking forward, in order for tree and alley crop production to be successful and sustainable, TKB has two main infrastructure needs: fencing and irrigation.

Fencing would help protect the farm from large animals such as bears and deer. Bears will go after hives and can quickly cause devastating damage. Deer often browse on young trees and shrubs, leading to damage or plant mortality. With the site's sandy soils, irrigation is needed. Drought events in 2024 and 2025 underscored Ang's conviction that they cannot invest in expanding their alley cropping system until irrigation is in place. In 2025, the farm was selected for funding through the USDA **Natural Resources Conservation Service** to support an irrigation system. The project design is still in process, and the installation is on hold.

Without reliable water, Ang has observed that it's difficult to fight back invasives, such as quack grass. Without irrigation for newly planted seed, the quack grass tends to outcompete the cover crops Ang and Bi have planted. *"We really need to establish other plants to beat the grasses, and we can't establish new plants without water."* The berries are not yet producing, and Ang attributes that in part to the lack of water. The chestnuts on the other hand have shown signs of success—a few trees in the 2023 planting flowered in 2025.



Chestnuts on one of the mature trees at They Keep Bees, planted approximately 30 years ago. Ang and Bi expect that the trees they planted in 2023 will be producing nuts at significant levels within the first 5-10 years. Photo by Ang Roell, used with permission.

Additional Resources

USDA National Agroforestry Center

Alley Cropping

Webpage

USDA National Agroforestry Center

Alley Cropping Agroforestry Note

Research Brief

Global Change Biology

Frontiers in alley cropping: Transformative solutions for temperate agriculture

Publication

University of Missouri Center
for Agroforestry

Economic Budgeting for Agroforestry Practices

Planning Guide

University of Missouri Center
for Agroforestry

Alley Cropping Training Manual

Training Manual

References

- ¹ Feibel, S., Stubblefield, K., & Bahrenburg, A. (2025). Direct marketing for agroforestry producers (Agroforestry Note No. 27). U.S. Department of Agriculture, Forest Service, National Agroforestry Center. <https://doi.org/10.2737/NAC-AN-27>
- ² Rajagopalan, K., DeGrandi-Hoffman, G., Pruett, M., Jones, V. P., Corby-Harris, V., Pireaud, J., Curry, R., Hopkins, B., & Northfield, T. D. (2024). Warmer autumns and winters could reduce honey bee overwintering survival with potential risks for pollination services. *Scientific Reports*, 14, 5410. <https://doi.org/10.1038/s41598-024-55327-8>
- ³ National Integrated Drought Information System. (2025, September 30). Drought status update for the Northeast. Drought.gov. <https://www.drought.gov/drought-status-updates/drought-status-update-northeast-2025-09-30>
- ⁴ USDA Southwest Climate Hub. (2022). Climate Quick Reference Guide: Massachusetts – Franklin County. https://swclimatehub.info/sites/swclimatehub.info/files/MASSACHUSETTS_FRANKLIN_CQRG_2022.pdf
- ⁵ Xue, Z., & Ullrich, P. A. (2022). Changing trends in drought patterns over the Northeastern United States using multiple large ensemble datasets. *Journal of Climate*, 35(22), 7413–7433. <https://doi.org/10.1175/JCLI-D-21-0810.1>
- ⁶ Hagen, A. B., Cangialosi, J. P., Chenard, M., Alaka, L., & Delgado, S. (2025). Hurricane Helene (AL092024) tropical cyclone report (Report No. TCR-AL092024). National Hurricane Center, National Oceanic and Atmospheric Administration. https://www.nhc.noaa.gov/data/tcr/AL092024_Helene.pdf
- ⁷ Beven II, J. L., Alaka, L., & Fritz, C. (2025). Hurricane Milton (AL142024) tropical cyclone report (Report No. TCR-AL142024). National Hurricane Center, National Oceanic and Atmospheric Administration. https://www.nhc.noaa.gov/data/tcr/AL142024_Milton.pdf
- ⁸ U.S. Global Change Research Program. (2023). Fifth National Climate Assessment. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program. https://toolkit.climate.gov/sites/default/files/2025-07/NCA5_2023_FullReport.pdf
- ⁹ Colbert, A. (2022, June 1). A force of nature: Hurricanes in a changing climate. NASA Science. <https://science.nasa.gov/earth/climate-change/a-force-of-nature-hurricanes-in-a-changing-climate/>

¹⁰ Walter, D., Jose, S., & Zamora, D. (2024). Alley cropping (Chap. 3). In M. Gold, H. Hemmelgarn, C. Todd, K. Stubblefield, A. Helland, O. Romanova, G. Beebe, & M. Daily (Eds.), Training manual for applied agroforestry practices (pp. 24-39). University of Missouri Center for Agroforestry; USDA National Agroforestry Center; Mid-America Agroforestry Working Group. https://centerforagroforestry.org/wp-content/uploads/2024/04/03_AlleyCropping_TrainingManual_2024Master_0410_Digital-4.pdf

¹¹ Torralba, M., Fagerholm, N., Burgess, P. J., Moreno, G., & Plieninger, T. (2016). Do European agroforestry systems enhance biodiversity and ecosystem services? A meta-analysis. *Agriculture, Ecosystems & Environment*, 230, 150–161. <https://doi.org/10.1016/j.agee.2016.06.002>

¹² Lee, K.-H., Isenhardt, T.M., Schultz, R.C. and Mickelson, S.K. (2000), Multispecies Riparian Buffers Trap Sediment and Nutrients during Rainfall Simulations. *Journal of Environmental Quality*, 29: 1200-1205. <https://acsess.onlinelibrary.wiley.com/doi/10.2134/jeq2000.00472425002900040025x>

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