



Agroforestry in U.S. Agriculture

Agroforestry is the intentional integration of trees or shrubs with agricultural crops or livestock to generate environmental, economic, and social benefits.¹ Livestock pastures, horticultural crop beds, orchards, and any other conventional farming practices such as row cropping of commodity crops (e.g., wheat, corn, and soy) can benefit from integrating agroforestry practices. The diverse array of practices provides flexibility to farmers to tailor agroforestry systems to the unique conditions on their land.

Agroforestry benefits both farms and the surrounding environment. Growing diverse crops on the same plot of land can increase the yield of marketable products, provide valuable ecosystem services, and reduce air and water pollution. Economically, preliminary studies have found that, depending on the crop type and environmental climate, crop yields can improve by up to 56%.² Agroforestry can also be a valuable source of both climate change mitigation—by growing trees that draw carbon out of the atmosphere—and climate adaptation—by improving a farm’s resilience to extreme weather.

Agroforestry, as an agricultural practice or technology, is not a novel concept. It is well-established in tropical regions and a form of traditional ecological knowledge (TEK). TEK includes the historical practices of Native Americans and Indigenous communities. U.S. farmers and ranchers have successfully used certain forms of agroforestry in the past as well. For example, windbreaks or woody buffers were planted to protect farmland during the dust bowl,³ practices that farmers continue to use today. However, agroforestry practices are currently only used on 1.5% of all U.S. farming operations.⁴ Ambitious expansion and adoption of agroforestry strategies will benefit the environment, the economy, and society. This issue brief begins with background about the challenges currently facing U.S. agriculture, followed by a section explaining how agroforestry can remedy these challenges. The brief concludes with a description of the various agroforestry practices and a table of the USDA agencies with programs supporting agroforestry.

QUICK SUMMARY

- Agroforestry is the incorporation of trees into conventional farming practices.
- Agroforestry could offset 33% of the United States’ current annual CO² emissions while increasing yields and diversifying food production.

¹ U.S. DEP’T OF AGRIC. AGROFORESTRY STRATEGIC FRAMEWORK: FISCAL YEARS 2019-2024 (2019), <https://www.usda.gov/sites/default/files/documents/usda-agroforestry-strategic-framework.pdf> [hereinafter “AGROFORESTRY STRATEGIC FRAMEWORK”].

² U.S. DEP’T OF AGRIC., GEN. TECH. REPORT WO-96A, AGROFORESTRY: ENHANCING RESILIENCY IN U.S. AGRICULTURAL LANDSCAPES UNDER CHANGING CONDITIONS (2017), https://www.fs.usda.gov/research/publications/gtr/gtr_wo96a.pdf.

³ *The Dust Bowl*, NAT’L DROUGHT MITIGATION CTR., <https://drought.unl.edu/dustbowl/> (last visited May 11, 2023).

⁴ Matthew M. Smith et al., *Census of Agriculture – Agroforestry Data*, U.S. DEP’T OF AGRIC. (2022), <https://www.fs.usda.gov/nac/maps-data/census-agriculture/index.php>.

Background on Current Challenges in U.S. Agriculture

The United States leads the world as a producer and supplier of agricultural goods. However, this incredibly valuable sector of our nation's economy is currently vulnerable to numerous threats, both within and outside of farmers' control. Vulnerabilities outside of farmers' control include high input prices, unpredictable markets, weather volatility, and an overreliance on imported foods.

First, American farmers are vulnerable to high input prices for necessary equipment and chemical products. The USDA's Economic Research Service forecast that 2023 farm production costs would rise to a record \$460 billion in 2023.⁵ Compounding these economic challenges, many farmers face significant risks from volatile agricultural markets and are looking for ways to insulate their operations from such risks by increasing the number of marketable products and/or boosting yields. Agroforestry can reduce the need for pricey inputs like fertilizer and pesticides while increasing yields and the number of marketable products.

Furthermore, climate-induced extreme weather events such as droughts, floods, extreme heat, wildfires, and erratic frosts have increased 83% in the past four decades, generating immeasurable expenses for American farmers.⁶ Agroforestry can help protect American farmlands from flooding, drought, and other extreme weather events, as discussed in the Benefits of Agroforestry section below.

Finally, the United States is on track to become a net importer of food by 2026.⁷ Agricultural imports grew by almost 17% in 2021,⁸ 50% of which are horticultural products such as fruits, vegetables, and tree nuts.⁹ This overreliance on foreign products leaves the United States vulnerable to shocks in the global food supply chain as evidenced by the COVID-19 pandemic and the war in Ukraine. Those supply chain issues exacerbated the already urgent epidemic of hunger and poor nutrition in the country. Crop diversification, through agroforestry, can increase the yield of current crop systems and increase domestic production of horticultural products, thereby reducing reliance on foreign agricultural imports and increasing the availability of nutritious, wholesome foods.

In addition to these external threats, American farmers are also suffering from decreased topsoil, diminished water resources, and declining populations of valuable

⁵ U.S. DEP'T OF AGRIC., ECON. RSCH. SERV., FARM SECTOR INCOME & FINANCES: FARM SECTOR INCOME FORECAST (Feb. 7, 2023), <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/farm-sector-income-forecast/>; see also Senator John Boozman, Opening Remarks at Hearing Entitled "Farm Bill 2023: Commodity Programs, Crop Insurance, and Credit" (Feb. 9, 2023) (transcript available at <https://www.agriculture.senate.gov/newsroom/rep/press/release/ranking-member-boozmans-opening-statement-at-hearing-entitled-farm-bill-2023-commodity-programs-crop-insurance-and-credit>).

⁶ INT'L FED'N OF RED CROSS AND RED CRESCENT SOC'IES, WORLD DISASTERS REPORT 2020: COME HEAT OR HIGH WATER (2020), https://www.ifrc.org/sites/default/files/2021-05/20201116_WorldDisasters_Full.pdf.

⁷ ERIK DOHLMAN, JAMES HANSEN, & DAVID BOUSSIOS, USDA AGRICULTURAL PROJECTIONS TO 2031, INTERAGENCY AGRICULTURAL PROJECTIONS COMMITTEE (2022).

⁸ *Agricultural Trade*, U.S. DEP'T OF AGRIC., ECON. RSCH. SERV. (2021), <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/agricultural-trade/>.

⁹ *Id.*



wildlife. First, farms across the country are losing topsoil at alarming rates; the Corn Belt (Midwestern United States) alone has already lost nearly a third of its topsoil, reducing crop yields and threatening the region's productivity.¹⁰ Farming practices that can reduce soil erosion and anchor fertile topsoil are crucial for protecting American farmers and farmland. Second, farming currently consumes and pollutes immense amounts of water, harming people and ecosystems. In 2013, the U.S. Environmental Protection Agency (EPA) reported that, in a nationwide 2008-2009 study, 55% of rivers and streams did not support healthy aquatic life, with excess nutrients (phosphorus and nitrogen), streamside disturbance, and poor vegetative cover identified as some of the biggest impacts on stream health.¹¹ Agriculture also accounts for 42% of the nation's freshwater withdrawals, with significant amounts of irrigated land concentrated in arid, drought-prone Western states.¹² Increasing water efficiency and drought resilience will be critical for a more sustainable American food system. Finally, when farms plant the same crop from fencerow to fencerow, this diminishes habitat for pollinators and other valuable wildlife. For example, pheasant hunting has declined 68% between 2001 and 2016, as wild birds have lost over 40% of their valuable habitat to conventional farming in the past three decades.¹³ Pollinating insects like honeybees, critical for fruits, nuts, and vegetables, are declining at rapid rates due to lack of habitat and exposure to agricultural chemicals.¹⁴ As explained in the next section, agroforestry provides a solution to these threats.

Benefits of Agroforestry

Agroforestry practices can generate a wide array of benefits for the surrounding soil, water, air, climate, and the farm itself. These economic, social, and environmental benefits often overlap and complement one another, and minimize the internal and external threats discussed above. For example, trees and shrubs planted as a windbreak around a concentrated animal feeding operation (CAFO) can improve air quality (by limiting the spread of odors and noxious fumes), increase yields (by shading the animals), reduce water pollution (by trapping runoff within its root systems), provide alternate income to the farmer (for example, many southern ranchers sell pecans harvested from trees planted on their property decades ago), and reduce the heating and cooling costs of buildings on the property.

Many of agroforestry's benefits occur beneath the surface of the soil. Trees and shrubs have **deeper root systems**¹⁵ that provide habitat for nitrogen-fixing bacteria, fungal

¹⁰ Evan Thaler, Isaac J. Larsen, & Qian Yu, *The Extent of soil loss across the US Corn Belt*, 118 PROC. NATL. ACAD. SCI. (2021), <https://www.pnas.org/doi/10.1073/pnas.1922375118>.

¹¹ ENV'T PROT. AGENCY, NATIONAL RIVERS AND STREAMS ASSESSMENT 2013–2014: A COLLABORATIVE SURVEY (2020), https://www.epa.gov/system/files/documents/2021-10/nrsa_13-14_report_508_ci_2021-10-15.pdf.

¹² CHERYL A. DIETER ET AL., U.S. GEOLOGICAL SURVEY NAT'L WATER USE SCI. PROJECT TEAM, ESTIMATED USE OF WATER IN THE UNITED STATES IN 2015 (2018), <https://www.ers.usda.gov/topics/farm-practices-management/irrigation-water-use/>.

¹³ SCOTT TAYLOR (ED.), NAT'L WILD PHEASANT TECH. COMM., NATIONAL WILD PHEASANT CONSERVATION PLAN (2021), <http://nationalpheasantplan.org/wp-content/uploads/2021/08/National-Pheasant-Plan-Second-Edition-2021.pdf>.

¹⁴ *Declining bee populations pose threat to global food security and nutrition*, FOOD AND AGRIC. ORG. (May 20, 2019), <https://www.fao.org/news/story/en/item/1194910/code/>.

¹⁵ Alain Pierret et al., *Understanding deep roots and their functions in ecosystems: an advocacy for more unconventional research*, 118 ANNALS OF BOTANY 621 (2016).

mycorrhizae,¹⁶ and other beneficial soil microorganisms.¹⁷ Deeper roots increase the soil's ability to absorb water, both decreasing the impact of drought-related water shortages and improving the land's ability to absorb excess rainfall and prevent damaging flooding.¹⁸ Beyond improving soil moisture retention, these deep, fixed root structures provide habitat for beneficial microorganisms, and can increase organic nitrogen retention.¹⁹ These complex root systems also hold the soil together much better, reducing surface runoff, soil erosion and nutrient loss by over 50% compared to conventional systems.²⁰ They also act as natural filters, halving chemical pollution by trapping and locking away fertilizers, pesticides, and other chemical inputs before they can pollute the surrounding environment.²¹

Agroforestry **supports water supplies and aquatic ecosystems** by reducing surface runoff, bacterial contamination, pesticide drift, and algal blooms caused by nutrient and chemical pollution.²² Decreased fertilizer runoff prevents the eutrophication of waterways, where algal blooms create oxygen-depleted “dead-zones” that can dramatically harm aquatic life.²³ Reducing pollution into public waterways also exposes fewer people to chemical contaminants and purifies drinking water sources, benefiting public health and local economies. Where agroforestry occurs next to the water, the trees' foliage shades the water, increasing the water's dissolved oxygen and enabling more aquatic life to thrive.²⁴

Agroforestry is also associated with **climate benefits and reduced air pollution**. A White House report on deep decarbonization recognized agroforestry as a potential strategy for climate mitigation and adaptation.²⁵ By increasing biomass both above and below ground, trees increase the rate of carbon sequestration and the total amount of carbon that an area of land can store, compared to conventional farming practices.²⁶ Some studies estimate that nationwide implementation of agroforestry

¹⁶ Kurt Haselwandter & Glynn D. Bown, *Mycorrhizal relations in trees for agroforestry and land rehabilitation*, 81 *FOREST ECOLOGY AND MANAGEMENT* 1 (1996).

¹⁷ Lukas Beule et al., *Abundance, Diversity, and Function of Soil Microorganisms in Temperate Alley-Cropping Agroforestry Systems: A Review*, 10 *MICROORGANISMS* 616 (2022).

¹⁸ U.S. DEP'T OF AGRIC., NAT'L AGROFORESTRY CTR., *WHAT IS A RIPARIAN FOREST BUFFER?* 1 (2012).

¹⁹ Ahmed S. Elyas et al., *Expanding agroforestry can increase nitrate retention and mitigate the global impact of a leaky nitrogen cycle in croplands*, 4 *NATURE FOOD* 109 (2023).

²⁰ Shibu Jose, *Agroforestry for Ecosystem Services and Environmental Benefits*, 76 *AGROFORESTRY SYSTEMS* 1 (2009).

²¹ Zhu, X., Liu, W., Chen, J. et al., *Reductions in water, soil and nutrient losses and pesticide pollution in agroforestry practices: a review of evidence and processes*, 453 *PLANT SOIL* 45, 48 (2020).

²² See U.S. DEP'T OF AGRIC., NAT'L AGROFORESTRY CTR., *WHAT IS A RIPARIAN FOREST BUFFER?* 1 (2012); Andy Mason et al., *An Overview of Agroforestry*, *AGROFORESTRY NOTES* (2014); U.S. DEP'T OF AGRIC., NAT'L AGROFORESTRY CTR., *WORKING TREES FOR WATER QUALITY* (3d ed. 2012).

²³ See *The Effects: Dead Zones and Harmful Algal Blooms*, ENV'T PROTECTION AGENCY (Jan. 20, 2023), <https://www.epa.gov/nutrientpollution/effects-dead-zones-and-harmful-algal-blooms#:~:text=Excess%20nitrogen%20and%20phosphorus%20cause,in%20the%20water%20s%20consumed>.

²⁴ U.S. DEP'T OF AGRIC., NAT'L AGROFORESTRY CTR., *WORKING TREES FOR WATER QUALITY* (3d ed. 2012).

²⁵ *United States Mid-Century Strategy for Deep Decarbonization*, WHITE HOUSE (2016), https://unfccc.int/files/focus/long-term_strategies/application/pdf/mid_century_strategy_report-final_red.pdf.

²⁶ U.S. DEP'T OF AGRIC. NAT'L AGROFORESTRY CTR., *WORKING TREES INFO: HOW CAN AGROFORESTRY INCREASE CARBON SEQUESTRATION?* (2021).



systems could sequester 530 MMT CO₂ per year.²⁷ That's roughly equivalent to the average annual emissions of 57.5 million American homes.²⁸ In addition to climate benefits, tree branches and foliage are highly effective wind breaks, preventing the soil, chemicals, and odors from getting kicked up and impacting local communities.²⁹

Agroforestry benefits farmers and ranchers immensely by increasing both productivity and economic profitability. By improving soil conditions, retaining more water, and protecting plants and animals from extreme weather, agroforestry has been shown to significantly increase yields in comparison to conventional agriculture.³⁰ Trees and shrubs can create habitat and protect migratory corridors for wildlife, including important pollinating birds, insects, and bats, which increase crop yields.³¹ Agroforestry can also increase farm profitability by providing an additional stream of income.³² Trees and shrubs can provide a wide range of diverse goods, including food (fruit, nuts, berries, etc.), fiber, timber, medicinal products, and botanical products.³³ Strategically shading areas of a farm can decrease energy expenditures on heating and cooling.³⁴ Finally, agroforestry can also help farmers to reduce their exposure to extreme weather events that risk wiping out their crops, livestock, and farm infrastructure.³⁵

Types of Agroforestry

There are five main categories of agroforestry practices recognized by USDA's Natural Resources Conservation Service: windbreaks; riparian forest buffers; silvopasture systems; forest farming; and alley cropping.³⁶ Each individual agroforestry system is unique, varying in design, characteristics, scale, and management; these systems often combine elements of multiple different categories of agroforestry practices.³⁷ Several key features and benefits are universal across all different types of agroforestry, and this diverse array of practices allows farmers to achieve positive results while tailoring agroforestry to their land's unique conditions.

- a. **Silvopasture** is a combination of tree cultivation with livestock grazing to encourage numerous synergistic benefits. The trees provide shade and weather protection for the livestock, while also absorbing excess

²⁷ Ranjith P. Udawatta & Shibu Jose, *Agroforestry Strategies to sequester carbon in temperate North America*, 86 *AGROFORESTRY SYSTEMS* 225 (2012).

²⁸ R. Daniel Bresser, *The mortality cost of carbon*, 12 *NATURE COMMUNICATIONS* 4467 (2021).

²⁹ Nathan Kafer & Richard Straight, *Windbreaks: An Agroforestry Practice*, *AGROFORESTRY NOTES* (2022).

³⁰ Kuyah, S., Whitney, C.W., Jonsson, M. et al., *Agroforestry delivers a win-win solution for ecosystem services in sub-Saharan Africa. A meta-analysis*, 39 *AGRON. SUSTAIN. DEV.* 47 (2019).

³¹ Gary Bentrup, *Promoting Pollinators with Agroforestry*, U.S. DEP'T OF AGRIC., FOREST SERV. (Aug. 20, 2020), <https://www.usda.gov/media/blog/2020/08/21/promoting-pollinators-agroforestry>.

³² Andy Mason Et Al., *An Overview of Agroforestry*, *AGROFORESTRY NOTES* (2014).

³³ *Id.* at 3.

³⁴ U.S. DEP'T OF AGRIC. NAT. RES. CONSERVATION SERV., *WINDBREAKS FOR CONSERVATION* (1974). <https://www.fs.usda.gov/nac/assets/documents/morepublications/windbreaksforconservation.pdf>.

³⁵ *Id.* at 3; GARY BENTRUP & KATE MACFARLAND, U.S. DEP'T OF AGRIC. FOREST SERV., *CLIMATE CHANGE RES. CTR., AGROFORESTRY* (2022), <https://www.fs.usda.gov/ccrc/topics/agroforestry>.

³⁶ *AGROFORESTRY STRATEGIC FRAMEWORK*, *supra* note 1.

³⁷ RAINFOREST ALLIANCE, *AGROFORESTRY - RESILIENT LAND USE THROUGH MORE HOLISTIC PRODUCTION SYSTEMS* (2022), <https://www.rainforest-alliance.org/wp-content/uploads/2022/01/agroforestry-resilient-land-use-through-more-holistic-production-systems.pdf>.

nutrients from animal waste, while the livestock can provide a shorter-term cash flow to diversify the tree farm's income streams.³⁸

- b. **Windbreaks (or shelterbelts)** are strategically planted trees or woody shrubs that can protect agricultural land from deleterious weather exposure, often in the form of linear borders of trees and shrubs. Reducing wind speeds prevents erosion and topsoil loss, retains moisture in the soil, and shelters both plants and animals from dangerous weather.³⁹
- c. **Riparian forest buffers** involve planting trees and shrubs along portions of farmland adjacent to bodies of water. The plants and their roots filter out pesticides, fertilizers, animal waste, and nutrients before they can enter drinking water supplies and aquatic ecosystems.⁴⁰
- d. **Forest farming (or multi-story farming)** involves growing certain high-value crops underneath a managed forest canopy. The trees provide shade and protection, and promote the microclimate, soil conditions, and interspecies interactions necessary to grow timber, as well as edible, medicinal, and decorative crops like ginseng, mushrooms, and goldenseal.
- e. **Alley cropping (or intercropping)** involves planting alternating rows of trees and shrubs that create 'alleys' for other crops to grow. Alley cropping can foster inter-species symbioses by utilizing trees and shrubs to influence shade, water, and nutrients for other crops.

Any of these practices alone, or in combination, can constitute an agroforestry practice. Additionally, many other practices not listed above can fall within the broad umbrella of agroforestry. There are many ways to integrate trees and shrubs into cropland to generate economic, ecological, and social benefits. Additionally, NRCS has recognized and supported agroforestry in urban areas, including through Grants for

³⁸ See U.S. DEP'T OF AGRIC., SILVOPASTURE (2008), <https://www.fs.usda.gov/nac/assets/documents/workingtrees/brochures/wts.pdf>; *Silvoepasture*, U.S. DEP'T OF AGRIC., NAT'L AGROFORESTRY CTR., <https://www.fs.usda.gov/nac/practices/silvopasture.php#:~:text=Silvopasture%20is%20the%20deliberate%20integration,and%20long%2Dterm%20income%20sources;see%20also%20Steve%20Gabriel,Six%20Key%20Principles%20for%20a%20Successful%20Silvopasture>, CORNELL COLLEGE OF AGRICULTURE AND LIFE SCIENCES (Jun. 28, 2018), <https://smallfarms.cornell.edu/2018/06/six-key-principles-for-a-successful-silvopasture/>.

³⁹ Nathan Kafer & Richard Straight, *Windbreaks: An Agroforestry Practice*, AGROFORESTRY NOTES (2022), <https://www.fs.usda.gov/nac/assets/documents/agroforestrynotes/an25w01.pdf>; U.S. DEP'T OF AGRIC. NAT. RES. CONSERVATION SERV., WINDBREAKS FOR CONSERVATION (1974), <https://www.fs.usda.gov/nac/assets/documents/morepublications/windbreaksforconservation.pdf>.

⁴⁰ See U.S. DEP'T OF AGRIC. NAT'L AGROFORESTRY CTR., WHAT IS A RIPARIAN FOREST BUFFER? 1 (2012), https://www.fs.usda.gov/nac/assets/documents/workingtrees/infosheets/rb_info_050712v3.pdf. The Hudson Estuary Trees for Tribes Program is an example of numerous successful projects to encourage landowners to adopt riparian forest buffers by disseminating educational resources and tailored assistance, offering free trees, and organizing volunteer planting. See N.Y. STATE DEP'T OF ENV'T CONSERVATION, TREES FOR TRIBES FACTSHEET (2020) https://www.dec.ny.gov/docs/lands_forests_pdf/tftfactsheet.pdf.



the Urban Agriculture and Innovative Production.⁴¹ **Urban forests** include a diverse array of land uses with different sizes and scales of perennial edibles grown in cityscapes around the world. Even with minimal land, this community agroforestry practice can provide fresh produce to surrounding residents, foster community connections, serve as an educational hub, and beautify the cityscape.

USDA Agroforestry Resources⁴²

In response to farms across the country embracing agroforestry, the USDA has developed an Agroforestry Strategic Plan that highlights the important role of the federal government to help disseminate and implement agroforestry knowledge and tools across the landscape.⁴³ The plan was developed with input from the agencies listed below, each of which is a member of USDA’s interagency task force on agroforestry.⁴⁴ The strategic plan includes three overarching goals: (1) ensure stakeholders interested in agroforestry have access to the resources they need, (2) continue research that will improve implementation and increase adoption of agroforestry practices, and (3) integrate agroforestry resources across USDA agencies, programs, and policies.⁴⁵ Central to implementing the strategic plan is the National Agroforestry Center (NAC), located in Lincoln, Nebraska. NAC, created by the 1990 Farm Bill, advances “the health, diversity, and productivity of working lands, waters, and communities through agroforestry.”⁴⁶

USDA Agency	Interactions with Agroforestry
Agricultural Marketing Service (AMS)	AMS programs that support marketing opportunities for agroforestry products include specialty crops, local food market channel research, grant programs, market news, the local and regional food working group, and organic and food safety certification programs.
Agricultural Research Service (ARS)	ARS research on the Natural Resources and Sustainable Agricultural Systems Program supports researchers at 70 locations, developing the technologies and strategies needed to help farmers and ranchers steward the Nation’s diverse agricultural mosaic.
Farm Service Agency (FSA)	FSA has several initiatives available to farmers, ranchers, and forest landowners to help with agroforestry, such as farm loans, farm support programs, and the Conservation Reserve Program.
Forest Service	Forest Service scientists carry out basic and applied research that result in science-based applications and tools that support management of all the Nation’s forests and trees, including agroforestry research and development activities conducted by the NAC.

⁴¹ *Urban Agriculture & Innovative Production Grants*, U.S. DEP’T OF AGRIC., <https://www.usda.gov/topics/urban/grants#grants-news>.

⁴² U.S. DEP’T OF AGRIC., *AGROFORESTRY ACROSS USDA AGENCIES*, <https://www.usda.gov/sites/default/files/documents/usda-agroforestry-brochure.pdf>.

⁴³ *AGROFORESTRY STRATEGIC FRAMEWORK*, *supra* note 1.

⁴⁴ *AGROFORESTRY STRATEGIC FRAMEWORK*, *supra* note 1 at 4.

⁴⁵ *AGROFORESTRY STRATEGIC FRAMEWORK*, *supra* note 1 at 3–9.

⁴⁶ *About the Center*, U.S. DEP’T OF AGRIC., <https://www.fs.usda.gov/nac/about/index.php> (last visited Apr. 24, 2023).

National Agroforestry Center (NAC)	NAC is focused on addressing three areas: Agroforestry Ecosystem Services—quantification of agroforestry impacts on key ecosystem services; Social and Economic Dimensions of Agroforestry—factors influencing adoption and retention of agroforestry; and Agroforestry Education, Networks, and Support—information transfer to landowners and managers.
National Agricultural Statistics Service (NASS)	Conducted once every five years, the Census of Agriculture looks at land use and ownership, operator characteristics, production practices, income, and expenditures. In 2022, NASS conducted the first agroforestry survey.
National Institute of Food and Agriculture (NIFA)	NIFA helps researchers, through grants, identify and meet research, extension, and education priorities in areas of public concern that affect farm, forest, and ranch producers; small business owners; youth and families; and communities. For example, NIFA funded a project to monitor pests and pollinators across four different agroforestry management practices. ⁴⁷
Natural Resources Conservation Service (NRCS)	NRCS works one-on-one with farmers, ranchers, and forest landowners to financially support (through EQIP and CSP) and implement conservation practices on working land to help address critical natural resource issues, including soil erosion, water quality and quantity, air quality, soil health, wildlife habitat, and damages caused by natural disasters. NRCS cost-sharing contracts can support the six agroforestry practices described above.
Rural Development	Rural Development support for agroforestry is provided through various programs such as the Appropriate Technology Transfer for Rural Areas (ATTRA) that provides technical information, and grants through the Rural Development Business Grant, and Value-Added Producer Grants programs.

While these existing resources are a great first step, those who recognize agroforestry’s promise have called on Congress and USDA to increase federal support for agroforestry’s expansion through existing and new programs.⁴⁸ Practitioners and supporters are looking to the next farm bill as an opportunity to enhance these offerings with more research, support for practice adoption and transitions, market development, and codification of key terms and strategic focus.

CONCLUSION

Agroforestry holds tremendous potential for American agriculture and its benefits are myriad. From economics to the environment, incorporating agroforestry practices into farming operations can increase profitability, improve environmental outcomes, and enhance resiliency. The variety of practices and flexibility to incorporate aspects

⁴⁷ U.S. DEP’T OF AGRIC., NAT’L AGROFORESTRY CTR., GUIDE TO AGROFORESTRY RESEARCH OPPORTUNITIES (2018), <https://www.fs.usda.gov/nac/assets/documents/morepublications/usdaafresearchfunding.pdf>.

⁴⁸ See *Agroforestry Can Shine in the Upcoming Farm Bill*, CARBON180, (Feb. 24, 2023), <https://carbon180.medium.com/agroforestry-can-shine-in-the-upcoming-farm-bill-702dd080a0c8>; Ayurelia Horn-Muller, *America’s agroforestry Renaissance*, AXIOS (Mar. 2, 2023), <https://www.axios.com/2023/03/02/agroforestry-funding-interest-climate>; Emma Scott et al., *Policy Pathways for Perennial Agriculture*, 6 FRONT. SUSTAIN. FOOD SYST (2022), <https://doi.org/10.3389/fsufs.2022.983398>.



of different practices means agroforestry solutions can be tailored to the unique needs of each individual operation. While existing USDA programs have helped early adopters implement these practices, increased support is necessary to fully realize the benefits of these traditional techniques.

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