

# Windbreaks: Old practice – new resources!



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## Creating Resilient Landscapes

USDA support for windbreaks has a long history from the Prairie States Forestry Project to today. The popularity of this practice is illustrated by a recent [synthesis](#) of 32 studies on windbreak adoption that showed 72-99% of farmers were satisfied with their windbreaks. With our changing climate, the relevancy and value of windbreaks will continue to increase as we build resilient and productive farms and ranches.

The USDA National Agroforestry Center has developed several new tools and resources that can help in communicating, planning, and designing effective windbreaks. These resources include:

### [Tree Advisor: Useful Trees and Shrubs for the Great Plains](#)

Tree Advisor is an online plant selection guide to help identify better species of trees and shrubs to achieve a suite of user-defined purposes in the U.S. Great Plains.

USDA National Agroforestry Center - Tree Advisor 1.0

Welcome

- PURPOSE RATING
- INDIVIDUAL SPECIES ATTRIBUTES
- CHARACTERISTIC COMPARISON
- TOOL INFORMATION

**tree Advisor**  
Useful Trees & Shrubs for the Great Plains

**Tree Advisor** assists in selecting species of trees and shrubs for obtaining conservation and production purposes in the northern and central Great Plains. Over 90 species are rated for 14 different purposes in 12 sub-regions. Ratings are on a scale of 10 (highest) to 0 (lowest). There are three primary ways to use this tool:

- Purpose Rating:** This option will identify higher rated species that will function relatively better than other species for particular purpose(s) in a sub-region.
- Individual Species Attributes:** This option can be used to view a species' growth and morphological characteristics and purpose ratings in a sub-region.
- Characteristic Comparison:** This option can be used to compare a specific growth or morphological characteristic for species in a sub-region.

### [Windbreak Economic Model](#)

This tool can be used to analyze cost benefits of a windbreak and was developed in cooperation with The Center for Agroforestry at the University of Missouri.

**Windbreak Economic Model v. 1.0**

**Windbreak Design:**

| Row    | Species                     | In Row Spacing | Planting Stock | Weed Control Method |
|--------|-----------------------------|----------------|----------------|---------------------|
| Row 1: | Shrub/Small Crown Deciduous | 3 ft.          | Bare root      | Chemical/Mow        |
| Row 2: | Deciduous tree (small)      | 8 ft.          | Bare root      | Chemical/Mow        |
| Row 3: | Deciduous tree (Large)      | 8 ft.          | Bare root      | Chemical/Mow        |
| Row 4: | No Row                      | None ft.       | None           | None                |
| Row 5: | No Row                      | None ft.       | None           | None                |
| Row 6: | No Row                      | None ft.       | None           | None                |

Length of Windbreak: 1000 ft. Site Preparation: Chemical Prep on Cropland Site. Minimum Acceptable Rate of Return (MARR): 5%

Main Crop: Wheat. Ave. Yield (bu): 45. Ave. Price/bu: \$ 7.00. Secondary Crop: Wheat. Ave. Yield (bu): 45. Ave. Price/bu: \$ 7.00

**Financial Analysis:**

| Scenario  | 20 Years After Planting (10 Years) | 40 Years After Planting (40 Years) | Payback Period |
|---|------------------------------------|------------------------------------|----------------|
| Net Present Value of Increased Crop Yields If New Windbreak:      | \$4,216                            | \$9,337                            | 8 Years        |
| Benefit/Cost Ratio:   | 4.27                               | 8.24                               |                |
| Net Present Value of Increased Crop Yield If Renovated Windbreak: | \$5,701                            | \$11,494                           | 6 Years        |
| Benefit/Cost Ratio:   | 5.22                               | 9.44                               |                |

### [Trees Outside Forests Map Viewer](#)

This viewer allows users to explore high resolution (1-meter) tree cover maps online and to download the GIS data by county. Currently, Kansas and Nebraska are available with other states in the Great Plains being added as completed.

USDA National Agroforestry Center Northern Research Station IA

Layers: Streams, Wetlands, Nebraska Tree Cover, Kansas Tree Cover, Cropland 2018, Soil Health, Soil Erosion/Potential

Map showing tree cover in a rural landscape.

### [Windbreaks of the Great Plains](#)

This story map provides a unique look into the history of windbreaks, their utility and current use, as well as innovative opportunities for their use into the future.

Windbreaks of the Great Plains

Windbreaks are strips of trees and/or shrubs planted and maintained to alter wind flow and microclimate, thereby protecting a specific area. They are often planted and managed as part of a crop and/or livestock operation. Windbreaks also improve the quality of life around farmsteads, rural homes, and communities.

The role of windbreaks on the landscape is very important. They reduce soil erosion, enhance crop production, protect livestock and structures, and benefit water conservation. Windbreaks also provide habitat for wildlife and pollinators, sequester carbon, and provide income opportunities.

This story map is intended to provide a unique look into the past and development of windbreaks, their utility and current use, as well as the innovation and opportunities for their use into the future.

Navigate this story by clicking the tabs at the top and interacting with additional content, maps, and stories.

Photo: A variety of windbreaks on South Dakota farm. Credit: iStock

### [Making Trees Outside Forests Count](#)

This story map highlights the spatial assessment methods used for the Trees Outside Forests Map Viewer.

National Agroforestry Center

**Making Trees Outside Forests Count**

Trees in agricultural landscapes, hereafter called trees outside forests (TOF), are an undercounted resource in the United States. These resources serve important ecological functions, yet little information describing their extent and location is readily available. Due to their linear nature and small patch size, these trees are seldom included in national forest inventories and natural resource monitoring programs. In addition, most satellite-derived datasets are too coarse to accurately depict these small or narrow groupings of trees.

Due to the absence of an inventory of TOF, this resource is seldom included in state, regional, and national assessments. This tool presents challenges for informed decision making in the sustainable management of these systems in the face of changing conditions.

The USDA Forest Service Northern Research Station Forest Inventory and Analysis program (FIA) and the USDA National Agroforestry Center, along with partners at Kansas Forest Service, University of Nebraska-Lincoln, South Dakota Division of Resource Conservation and Forestry, North Dakota Forest Service, and Texas Forest Service, have been leading the first of its kind effort to assess and map TOF resources in response to user information. The generated maps to the right are examples of these mapping

### [Agroforestry Webinar Library](#)

This online library holds 179 webinars on agroforestry, including 25 windbreak-specific webinars and 77 general webinars that can support planning, design, and management of windbreaks.

**Agroforestry Webinar Library**

Many organizations use webinars to provide training, share information, and promote agroforestry. Use the table on this page to review archived webinars hosted by USDA National Agroforestry Center (NAC) partners related to agroforestry practices and related issues. If you know of additional webinars that should be added to this list, please contact [Kate MacFarland](#).

Filter by Practice:  Alley Cropping (5),  Forest Farming (20),  General (77),  Riparian Forest Buffers (24),  Silvopasture (28),  Windbreaks (25)

Filter by Year: +

Uncheck/Check All  
Displaying 25 of 179

| Agroforestry Practice | Webinar Title  | Presenter        | Year | Webinar Host            |
|-----------------------|--|------------------|------|-------------------------|
| Windbreaks            | <a href="#">Wind Protection Needs Past and Present</a>   | Bruce Wight      | 2021 | Nebraska Forest Service |
| Windbreaks            | <a href="#">Windbreak Design or How Windbreaks Work</a>  | Richard Straight | 2021 | Nebraska Forest Service |
| Windbreaks            | <a href="#">Windbreak Purposes</a>   | Richard Straight | 2021 | Nebraska Forest Service |
| Windbreaks            | <a href="#">International Agroforestry &amp; Windbreaks</a>                                      | Lord Ameyaw      | 2021 | Nebraska Forest Service |
| Windbreaks            | <a href="#">Developing the "Tree and Shrub Planting Plan" - Getting Those Boots in the Field</a> | Craig Stange     | 2021 | Nebraska Forest Service |

### [SARE Agroforestry Project Index](#)

This database showcases 224 SARE-funded projects that are related to agroforestry, including 14 windbreak-specific projects and 116 general projects that can inform windbreak planning and management.

**Sustainable Agriculture Research and Education (SARE) Agroforestry Grants**

The [USDA National Institute of Food and Agriculture's](#) (NIFA) [Sustainable Agriculture Research and Education](#) (SARE) program funds many grants that support research and outreach in agroforestry. These include grants targeted at farmers/ranchers, professional development, and partnerships. Such efforts can inform decisions regarding agroforestry implementation and research. This table catalogues and indexes many SARE projects related to agroforestry. It also links to the overview of each project provided in the SARE project database. Use this tool to search past projects by agroforestry practice, state, date, and project type. If you know of additional SARE-funded projects that should be added to this catalogue, or would like to provide feedback, please contact [Kate MacFarland](#).

Thank you to David Livingstone and Nicolas Manzi from the University of Nebraska for their help with compiling this information in June 2018.

Filter by State:  Texas (2),  Utah (1),  Vermont (4),  Virginia (7),  Washington (4),  West Virginia (4),  Wisconsin (12),  Wyoming (1)

Filter by Type:  Farmer/Rancher (88),  Graduate Student (26),  Matching Grants Program (1),  PDP State Program (1),  Partnership (20)

| Agroforestry Practice | Title  | State        | Year | Project Type           |
|-----------------------|--|--------------|------|------------------------|
| Windbreak             | <a href="#">Examining the role of shelterbelts, (tree plantings) on early-season honey production and hive growth of honeybees in the North Central Region (NCR)</a> | North Dakota | 2019 | Research and Education |
| Windbreak             | <a href="#">Supporting Natural Enemies of the Cabbage Aphid with Hedgerow Plantings</a>  | Utah         | 2018 | Partnership            |
| Windbreak             | <a href="#">Integrating Flowering Windbreaks for Insect Management in Cucumbers</a>  | Michigan     | 2014 | Graduate Student       |