SAVANNA INSTITUTE

UNDERSTANDING AGROFORESTRY

Windbreaks

Strips of trees and shrubs designed to enhance crop or livestock production while providing conservation benefits.

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BENEFITS

Economic

ENERGY COST REDUCTION: Reduces heating and cooling needs for living and working space by reducing indoor air exchange caused by wind.

HIGHER CROP YIELDS: Protects wind-sensitive crops and can increase total yields and crop quality.

SHADE PROVISION AND WIND PROTECTION FOR LIVESTOCK: Trees shade during the heat of the summer and provide protection from the wind.

DIVERSIFIED INCOME/FOOD SECURITY: Trees and shrubs planted in windbreak can be cultivated as food, fiber, and fodder to be marketed or used for subsistence purposes.

Ecological

SOIL HEALTH: Reduces soil loss caused by wind.

GREATER WATER AVAILABILITY to nearby crops due to lower evapotranspiration rates via reduced wind speed and the effects of catching snow.

ODOR AND POLLUTANT BLOCKAGE: Trees filter and block dust, drifting pesticides, and odors from nearby farms and homes.

WILDLIFE HABITAT AND CORRIDORS: Provides resources for pollinators and refuge for beneficial insects that control pests on farm.

CHALLENGES

FINANCIAL INVESTMENT: Requires farm to take area out of commodity crop production. Incorporating tree and shrub crops into windbreak helps to offset loss in acreage.

POTENTIAL TRADEOFFS: If windbreak design is intended to meet a combination of economic and ecological objectives, there may be tradeoffs in performance and/or cost among potential designs.

HIGH INITIAL INVESTMENT, SLOW RETURN: Including crop-producing trees and shrubs can require high maintenance (pruning, herbivory prevention, and weed control) in initial years when there are not yet returns via harvest.

PUTTING IT INTO PRACTICE

Frequently Asked Questions

DESIGN CONSIDERATIONS?

HEIGHT AND LENGTH: height determines how far downwind protection will reach and length determines total area protected.

DENSITY: can be managed by plant species chosen. Higher windbreak density provides greater wind speed reduction.

ORIENTATION: windbreaks are most effective when oriented at right angles (L or U shapes).

PLACEMENT: windbreaks should be placed on windward sides of fields. Both summer and winter wind directions should be considered.

WHAT TO PLANT?

Species composition can greatly impact the effectiveness of a windbreak. Species may include fruit and nut producing shrubs and trees for an edible windbreak. Recommended planting plan with rows listed windward to leeward.

ROWS 1-2: Short, dense shrubs. (e.g. willow, hazelnut, brambles, currants, elderberry)

ROWS 3-4: Tall shrubs or short broadleaf trees. (e.g. plum, persimmon, serviceberry)

ROWS 5-6: Dense, mixed conifers.

ROWS 7-8: Tall broadleaf hardwoods. (Can also be mixed with fast growing trees, such as hybrid poplar, for a quick windbreak that will transition to the hardwoods over time.)

MANAGEMENT?

Proper care for windbreaks is critical for long-term functioning. Weeding, pest and disease monitoring/ control, protection from livestock and wildlife damage, pruning or replanting, and supplemental watering may be needed on a continuing or periodic basis.

FUNDING AND PLANNING ASSISTANCE?

Connect with the local conservation district and extension offices to learn about federal and state cost-share programs such EQIP, CRP, and CSP. These offices can also provide connections with regional consultants and technical service providers.

The Savanna Institute is a 501(c)(3) nonprofit organization working to catalyze the development of and adoption of resilient, scalable agroforestry in the Midwest US. We work in collaboration with farmers and scientists to develop perennial food and fodder crops within multifunctional systems grounded in ecology and inspired by the savanna biome. The Savanna Institute strategically enacts this mission via research, education, and outreach.

SARE Sustainable Agriculture Research & Education

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