



Agroforestry

Working Trees for Agriculture



Imagine for a moment a farm product that could control wind erosion, increase crop yields, and absorb water-polluting runoff. What if it could also protect livestock from cold winter winds and summer heat, improve weight gain, and reduce energy costs? A product that provides additional sources of income for farmers and at the same time helps to create a more diverse and healthy countryside, with clean water and more abundant wildlife and aquatic plants and animals. Most of us would rush out to purchase it!

Of course, no such product exists. However, there is an innovative concept that has contributed its share to doing these very things. It's agroforestry — combining agriculture and forestry. Putting trees to work for agriculture. Agroforestry's working trees help make agricultural systems more healthy and sustainable by protecting crops and livestock, conserving natural resources, improving human environments, and providing new sources of income.

Putting trees to work in conservation and production systems for farms, ranches, and communities means planting the right trees in the right places, at the right time, and in the correct design to achieve desired benefits. With agroforestry practices incorporated, an agricultural countryside might include windbreaks in fields, riparian buffer strips along waterways, wooded pastures, alley cropping with annual crops and high-value hardwood trees, and “forest farming” operations where high-value specialty crops (like herbs, medicinal plants, or mushrooms) are grown under the protection of a tree canopy. Look inside for more information on agroforestry practices.

Agroforestry can be a win-win situation for landowners and everyone who cares about the health of our land and water. It provides opportunities to balance productivity and profitability with environmental stewardship, and pass on healthy and sustainable agricultural systems to future generations.



Forest Farming

In forest farming, high-value specialty crops are cultivated under the protection of a forest canopy that has been modified to provide the correct shade level. Crops like ginseng, shiitake mushrooms, and decorative ferns are sold for medicinal, culinary, or ornamental uses. Forest farming provides income while high-quality trees are being grown for wood products.



Windbreaks

Windbreaks are planted and managed as part of a crop and/or livestock operation to enhance production, protect livestock, and control soil erosion. Field windbreaks protect a variety of wind-sensitive row, cereal, vegetable, orchard and vine crops, control wind erosion, and increase bee pollination and pesticide effectiveness. Livestock windbreaks help reduce animal stress and mortality, reduce feed consumption, and help reduce visual impacts and odors. Living snowfences keep roads clean of drifting snow and increase driving safety. They can also spread snow evenly across a field, increasing spring soil moisture.

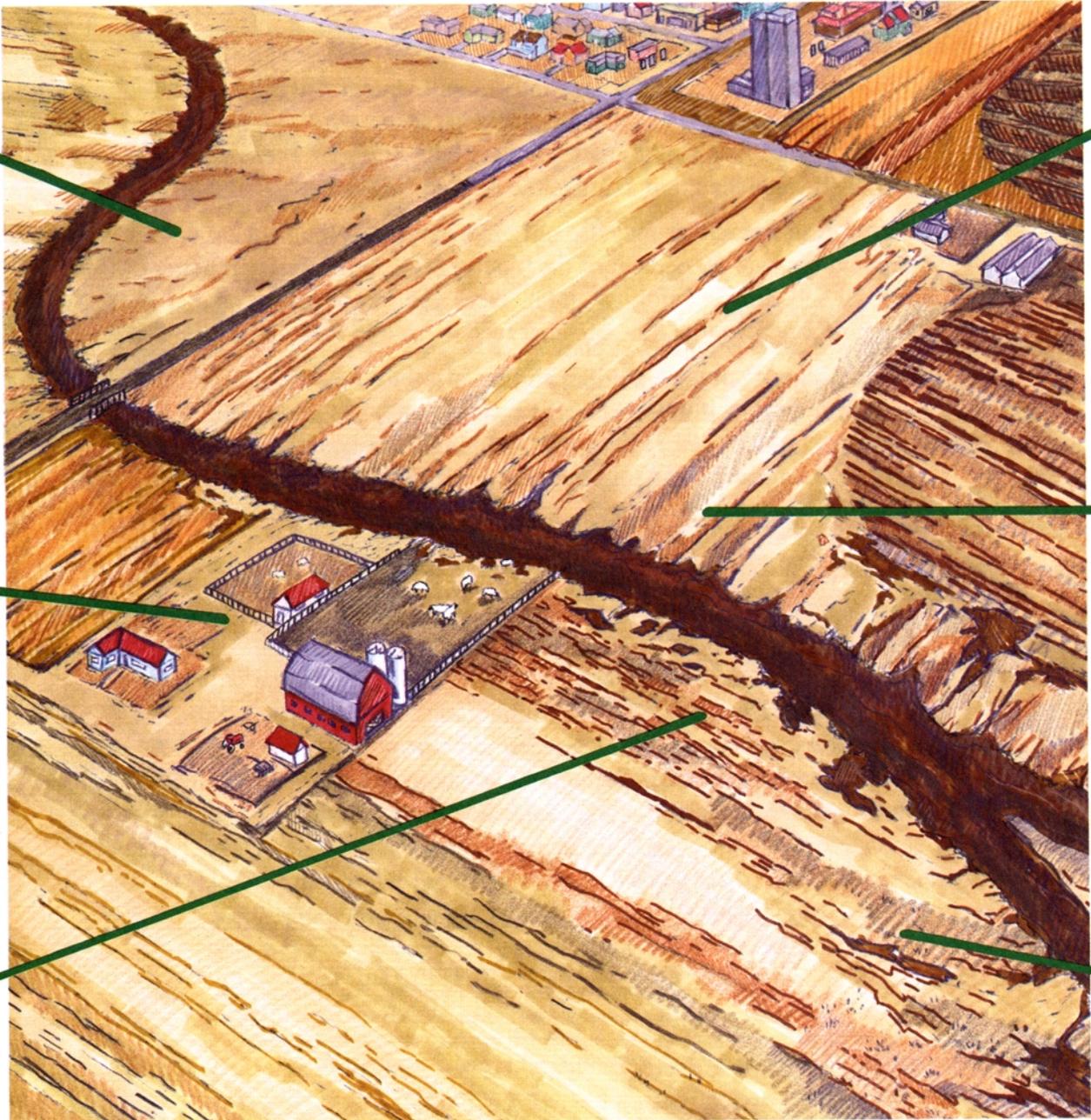


Riparian Buffer Strips

Natural or re-established streamside forests made up of tree, shrub, and grass plantings buffer non-point source pollution of waterways from adjacent land, reduce bank erosion, protect aquatic environments, enhance wildlife, and increase biodiversity.



Agroforestry Practices

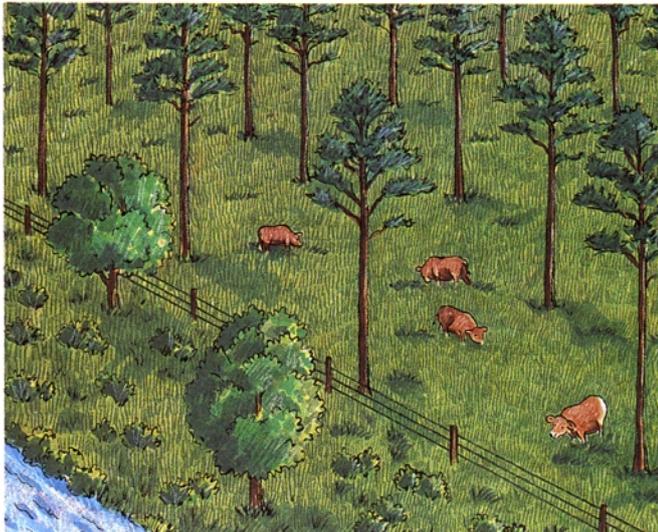


A land without trees like the one above, is not environmentally sound or aesthetically pleasing. Incorporating appropriate agroforestry practices, as shown in the illustrations to each side, will increase agricultural productivity, protect natural resources, provide new sources of income, and enhance environments for wildlife and people.



Alley Cropping

An agricultural crop is grown simultaneously with a long-term tree crop to provide annual income while the tree crop matures. Fine hardwoods like walnut, oak, ash, and pecan are favored species in alley cropping systems and can potentially provide high-value lumber or veneer logs. Nut crops can be another intermediate product.



Silvopasture

Silvopasture combines trees with forage and livestock production. The trees are managed for high-value sawlogs and at the same time provide shade and shelter for livestock and forage, reducing stress and sometimes increasing forage production. In plantations of conifers or hardwoods for timber or Christmas trees, managed grazing provides added products and income. Some nut and fruit orchards may also be grazed.



Special Applications

Tree and shrub plantings may be used to help solve special farm concerns such as disposal of animal wastes and filtering irrigation tailwater while producing a short or long rotation woody crop. Special multi-row "timberbelts" can be managed both to protect crops or livestock and to produce hardwood timber or a short-rotation woody crop for fuel or fiber. All of the agroforestry practices can be enhanced to provide wildlife habitat. Plantings of trees, shrubs, grasses, and feedgrains provide havens for wildlife.

Agroforestry...

...To Diversify Income

Fluctuating markets, unpredictable weather patterns, and international competition are all a part of today's modern agricultural world. Diversification reduces risk and can make the difference between success and failure for a farming or ranching enterprise. Agroforestry practices can provide a diversified income for a farm or ranch while still working every day to increase crop yields and conserve natural resources.

Valuable products that can be harvested from agroforestry practices include fuelwood, wood for energy generation and paper production and landscaping chips, fruits and nuts, wood shavings for animal bedding material, Christmas trees, sawlogs for dimension lumber, high-value timber products such as furniture-quality wood and veneer logs, and high-value specialty crops like decorative ferns, mushrooms, herbs, and medicinals.

...To Enhance Productivity

Studies show that farm productivity can be increased substantially when agroforestry practices are introduced. Windbreaks protect crops and livestock, provide shelter for feedlots, keep soil in place, and filter out harmful chemicals that pollute water.

Livestock protected by trees show improved weight gains of as much as 10 percent and require up to 50 percent less feed. Milk production can increase by 8 to 20 percent. Survival rate of newborn lambs and calves can increase substantially. And, disastrous losses from blizzards can often be avoided, especially compared to a treeless environment.

Furthermore, tree systems can successfully protect sensitive crops such as vegetables, vines, orchards, herbs, and soft fruits and flowers from temperature stress and wind damage.

During severe weather years, tree windbreaks have increased crop productivity by as much as 25 percent and hay yields by 20 percent.

...To Conserve Energy

Agroforestry practices can reduce energy use significantly. For example, wood from agroforestry practices provides an alternate source of farm fuel. Living snowfences reduce the need for snow removal, thus saving fuel, and field windbreaks improve crop water-use efficiency thereby reducing irrigation costs.

Trees reduce energy costs. Farm homes protected by windbreaks can expect heating costs to be cut by as much as 30 percent, especially in the high wind, low temperature regions of the United States.

...For Conservation

Agroforestry practices connected with other appropriate practices create conservation buffer systems to help control runoff, soil loss, and pollution from heavy rains.

The roots of trees and shrubs along rivers, streams, and ditches filter contaminated shallow groundwater and surface runoff laden with sediment, nutrient, chemical, and biological contaminants before they reach the water course. This helps to keep our water clean and more suitable for recreational use, domestic water use, and fish and wildlife habitat.

...To Create A Healthy Environment

When agroforestry practices are intentionally integrated into conservation systems, the resulting interactions can enhance the soil, water, air, plant, animal, and human resources of the farm or ranch. The challenge is to apply the practices in the key locations of the farm and watershed to maximize the desired benefits.

Agroforestry practices may use only five percent of the land area of a farming system yet account for over 50 percent of the biodiversity. Agroforestry practices improve both terrestrial and aquatic wildlife habitat. Trees and shrubs grown near crops and gardens harbor birds and beneficial insects that feed on pest insects and mammals.

Populations of valuable wildlife species also increase with the addition of trees and shrubs into agricultural areas. This increase provides opportunities for both hunting and nonconsumptive uses, such as birdwatching. Finally, tree-induced biodiversity adds variety to the landscape and improves aesthetics.

...To Meet People's Needs

People and communities are an important part of agricultural systems. Agroforestry addresses human needs by improving quality of life, health, comfort, enjoyment, security, and recreation. Agroforestry can provide a more diverse farm economy leading to more stable farms, ranches, and communities. Agroforestry practices not only apply to rural farms, but communities as well. In fact, agroforestry practices like windbreaks and riparian forest buffers are being put to work in and near communities to protect soil, water, wildlife, roads, buildings, and recreational areas.



National
Agroforestry
Center



NAC's Mission: The National Agroforestry Center is a partnership of the USDA Forest Service, Rocky Mountain Station and the USDA Natural Resources Conservation Service. The Center's purpose is to accelerate the development and application of agroforestry technologies to attain more economically, environmentally, and socially sustainable land-use systems. To accomplish its mission, the Center interacts with a national network of cooperators to conduct research, develop technologies and tools, and provide useful information to natural resource professionals.

Address: National Agroforestry Center, USDA Forest Service, Rocky Mountain Station/USDA Natural Resources Conservation Service, East Campus-UNL, Lincoln, Nebraska 68583-0822. For a supply of brochures, contact Kim Isaacson, 402-437-5178 ext. 13. For more information on the Center, contact Jerry Bratton, 402-437-5178 ext. 24 or Bruce Wight, ext. 36.

Most agroforestry practices can be supported by cost-share incentives provided by federal, state, or local governments through programs like the Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), and the Stewardship Incentives Program (SIP). Contact your State Forester, local Conservation District, or the Natural Resources Conservation Service (NRCS) for information about technical assistance and the various incentives presently available.

USDA policy prohibits discrimination because of race, color, national origin, sex, age, religion, or handicapping condition. Any person who believes he or she has been discriminated against in any USDA-related activity should immediately contact the Secretary of Agriculture, Washington, DC 20250.

