"Let this be your canvas and write a history on your landscape using trees." Unknown

Agriculture Resiliency

Agroforestry

Snohomish Conservation District

working together for better ground since 1941

AGROFORESTRY

What is Agroforestry?

Agroforestry is a new name for an ancient, sustainable system of farming that has been practiced around the globe for thousands of years. Agroforestry is a form of "multifunctional agriculture," where harvestable trees and shrubs are combined with annual crops and/or livestock on the same unit of land. By blending agriculture and forestry, farmers have the opportunity to produce high value tree products with strong markets while maintaining regular income with annual companion crops and livestock. The trees and shrubs grown in an agroforestry system also improve soil health, water quality, and wildlife habitat, allowing a farm to maximize economic production and ecological protection simultaneously on the same parcel of land.

Agroforestry optimizes the benefits from biological interactions created when trees and shrubs are deliberately combined with crops and/or livestock. By combining principles of forestry, agriculture, and ecology, a more diverse, integrated, and therefore profitable and productive land use system is created (Tewari, 2008).

Agroforestry is "Land Sharing"

Land sparing and land sharing are two very different philosophies of land use planning. Land **sparing** is the conventional idea of keeping agriculture and wilderness separate. Land is set aside exclusively for intensive agriculture (designed to increase production to the maximum extent possible) or for conservation (e.g., sanctuaries and habitat for certain species). Land **sharing**, on the other hand, is a strategy where the same piece of land is used for both production and conservation. Agroforestry is an example of a "land sharing" land use.

> Agroforestry requires shifting our thinking…Traditional disciplinary approaches to problem-solving such as the forester dealing with the trees, the soil scientist with the soil, and the hydrologist with the water, are no longer sufficient… Agroforestry challenges land managers to transcend disciplinary boundaries and explore the potential synergism between production agriculture and natural resource management (Garrett et al, 1994).

Agroforestry Practices

The guiding principles of agroforestry systems are for them to be: biologically possible, ecologically sustainable, socially acceptable, and economically feasible. The five main agroforestry practices recognized in North America are (Garret, 2009):

1. Alley Cropping – the cultivation of food, forage, or specialty crops between rows of trees. Alley cropping is a larger version of intercropping or companion planting conducted over a longer time. This practice can provide profitable opportunities for row crop farmers, hardwood timber growers, nut growers, and Christmas tree growers.

2. Forest Farming – the cultivation or management of understory crops within an established or a developing forest. A forest farming system takes advantage of seven layers of production to include root, fungal, vine, vegetative, shrub, understory canopy, and overstory canopy. Examples of crops that can be grown in such a system include medicinal plants such as ginseng or goldenseal, mushrooms such as truffles or shitakes, berries such as salal, currants, or huckleberry, and crafting materials such as bows or branches for baskets and wreaths.

3. Riparian Buffers – a transition zone between aquatic and upland environments consisting of trees, shrubs, and other vegetation which is managed to reduce the impact of upland sources of pollution, to stabilize stream channels and shorelines, and to provide food, cover, and thermal protection to aquatic and terrestrial wildlife.

4. Silvopasture – the integration of trees, forage plants, and livestock in an intensively-managed system which provides a means of diversifying on-farm income by providing short-term income from grazing while trees are grown for longer-term profit.

5. Windbreaks – barriers of trees and shrubs used to protect crops and livestock from winds and drift, to define boundaries, to provide tree products, improve landscape aesthetics, and to provide wildlife habitat.

These practices can be used on the landscape individually or can be combined to create landscape-wide diversity of production and ecological benefit. Each practice is designed to maximize production, meet on-farm ecological and economic goals, and to maximize protection of natural resources. Trees are selected for their crop value and their physiology.

Agroforestry practices are designed to maximize synergies, exploiting the beneficial role of trees within a landscape. For example, deep rooting trees bring up nutrients and water from lower in the soil profile, utilizing these nutrients for themselves, but also contributing some of those resources to the annual crops around them. The release of nutrients from the decomposition of tree residues (undersized logs, branches, shrubs, bark, leaves, and roots produced in the process of forest tending and thinning) can also be synchronized with the requirements for nutrient uptake of adjacent crops. Agroforestry systems are designed for both production and conservation benefits taking advantage of positive interactions between annual and perennial crops to improve overall land use.

Benefits

Agroforestry practices implemented on one parcel of land can create widening circles of benefits across the social, economic, agricultural, and ecological spectrums. With growing consumer, regulatory, and environmental pressures there is an increasing demand for agricultural practices such as agroforestry that limit external inputs, maximize natural nutrient cycles, and sustain or increase productivity while also protecting the environment.

Some benefits of agroforestry practices include:

Soil Health: Integrating trees and shrubs into an agricultural landscape can improve soil ecology by increasing biodiversity of soil organisms, organic matter, nutrient cycling, and water-holding capacity. Nitrogen-fixing trees and shrubs can substantially increase nitrogen inputs and the organic matter from trees and shrubs contribute significantly to soil fertility. Trees and shrubs can also decrease wind and water erosion, thereby improving the retention of moisture, soil, organic matter, and nutrients.

Pesticides and Herbicides: Agroforestry can decrease weed competition and improve the biological regulation of major insect pests, reducing the need for pesticides and herbicides. This saves money and labor for farmers, and reduces the potential for the contamination of ground or surface water. In addition, trees and shrubs grown in riparian buffers can absorb fertilizers and other contaminants before they have the chance to reach water sources.

Economic Resiliency: By producing multiple products, farmers can increase their source of income and reduce economic risks by having access to additional markets. On a broader scale, this can help stimulate the whole rural economy, leading to more stable farms and communities. Growing multiple crops can also help increase the genetic diversity in the food system, which can have food security implications.

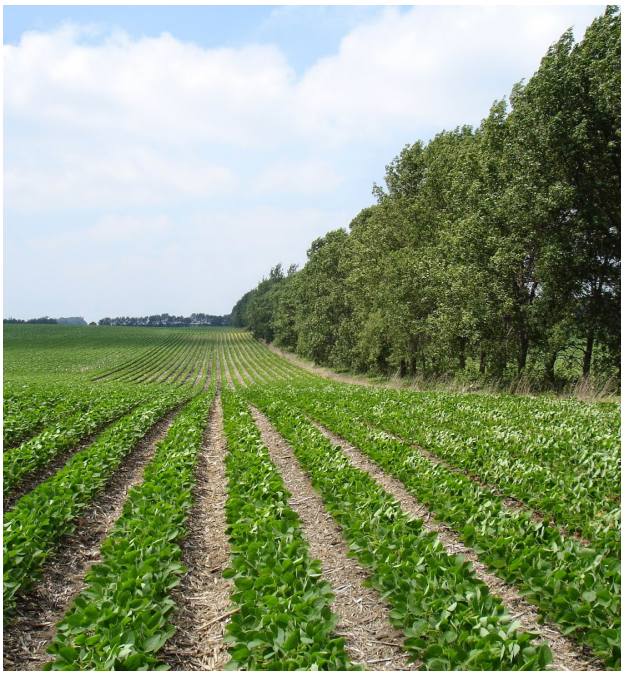
Climate Change: Agroforestry could play an important role in mitigating climate change since agroforestry practices sequester significantly more atmospheric carbon in plants and soil than conventional farming.

Wildlife Habitat: By adding trees and shrubs into a farm landscape, farmers can increase pollination from native bees and provide habitat for beneficial insects that can combat crop pests. This can also be a benefit to the larger community by providing habitat for birds and other wildlife.

Livestock Health: Trees and shrubs can be planted to protect livestock from wind chill in winter and provide shade in the summer. Windbreaks can also benefit livestock (and neighbors) by screening dust, odors and noise.

How to Begin

Agroforestry practices can be applicable to all scales of agriculture from small manual plots to large mechanized operations. Regardless of the size of your operation, there are several considerations to be made when moving towards adoption of agroforestry practices. Analyzing your specific farm or field is a necessary first step in designing an agroforestry system that will work for your particular operation. Analyzing climate, soil type, topography, markets, equipment, hydrology, tree/crop interactions, and many other factors will be necessary in proper design and function of a successful agroforestry system. A natural resource planner from the Snohomish Conservation District can perform such an analysis. Carrie Brausieck, Natural Resource Planner with the Snohomish Conservation District has a certification in Agroforestry and is available for consultation on establishing agroforestry practices. To contact Carrie, email cbrausieck@snohomishcd.org or call 425-377-7014.



Agroforestry systems are dynamic and will require adaptive management. This simply means that management methods may have to change over time as the system changes. Agroforestry practices are continually being researched and adapted towards better design to reach the full potential of benefits.

Find Out More

For more information on agroforestry contact the Snohomish Conservation District at (425) 335-5634.

USDA Agroforestry website with fact sheets on each recognized agroforestry practice

- https://www.usda.gov/topics/forestry/agroforestry

The Center for Agroforestry at the University of Missouri

- http://www.centerforagroforestry.org/

Association for Temperate Agroforestry

- http://www.aftaweb.org/about/what-is-agroforestry.html

World Agroforestry Center

- http://www.worldagroforestry.org/

References:

Nair, P. K. R. 1993. An Introduction to Agroforestry. International Centre for Research in Agroforestry. Kluwer Academic Publishing. London.

Garret, G. (ed). 2009. North American Agroforestry: An Integrated Science and Practice 2nd ed. American Society of Agronomy. Madison.

Tewari, S. K. 2008. Farm Forestry. Agro-forestry Project Dept. of Genetics and Plant Breeding. College of Agriculture G. B. Pant University of Agriculture and Technology. Pantnagar. 263145 (14-1-2008)