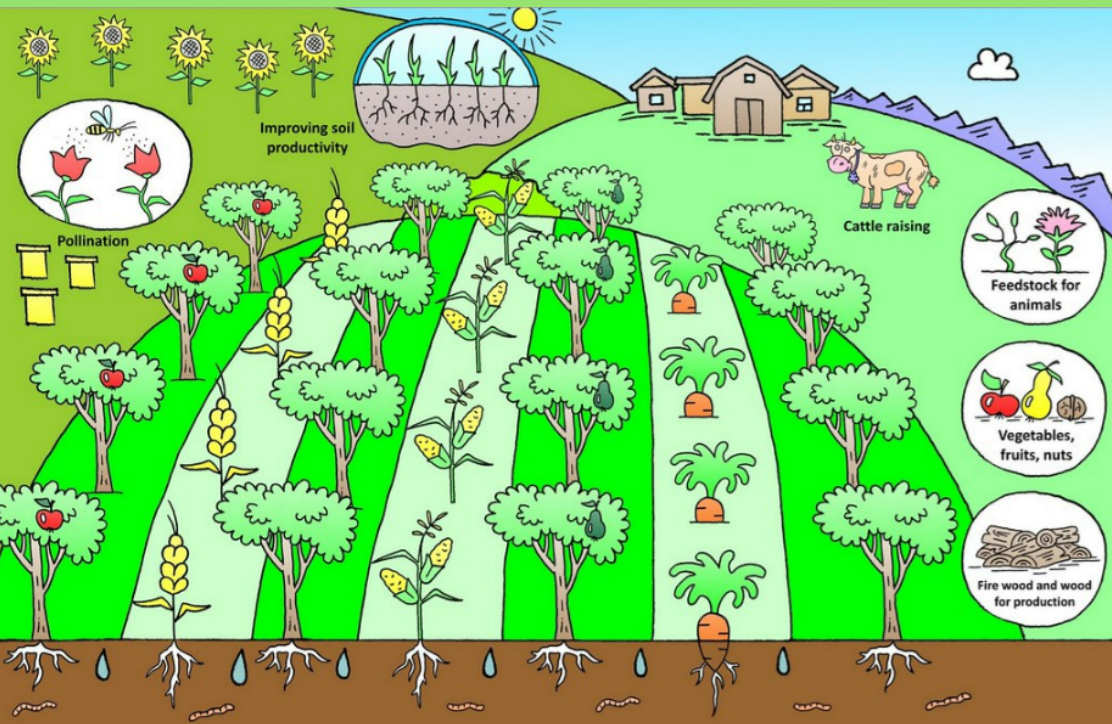


Common Agroforestry Practices



Distributed by the Dartmouth Agroforestry Short Course, as part of the Ong Agroecology Lab

Agroforestry Overview

Agroforestry is the purposeful integration of trees into agricultural systems for environmental, economic, and social benefits. Some possible advantages of agroforestry include the improvement of air and soil quality, the addition of cash crops, or the inclusion of wildlife habitats.

In the following pages, we describe five key agroforestry practices, as described by the USDA. Yet, it must be emphasized that these are only a few of the many ways in which agroforestry can be practiced on farms.



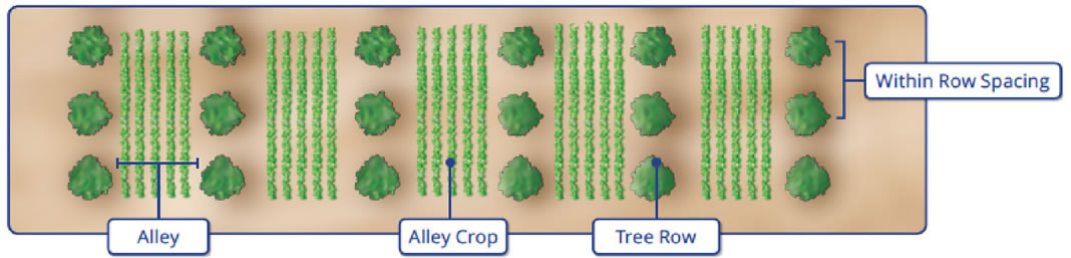
Alley Cropping

Overview

Alley cropping is the practice of planting rows of trees to form alleys, within which farmers can grow crops. These trees add structural stability to crops, and a new source of income to farms.

Though the practice of alley cropping wasn't popularized until a study in the 1970's-80's, we can trace its origins back to Southeast Asia, where wealthy landowners would allow poor workers to grow crops between rows of trees.





Benefits

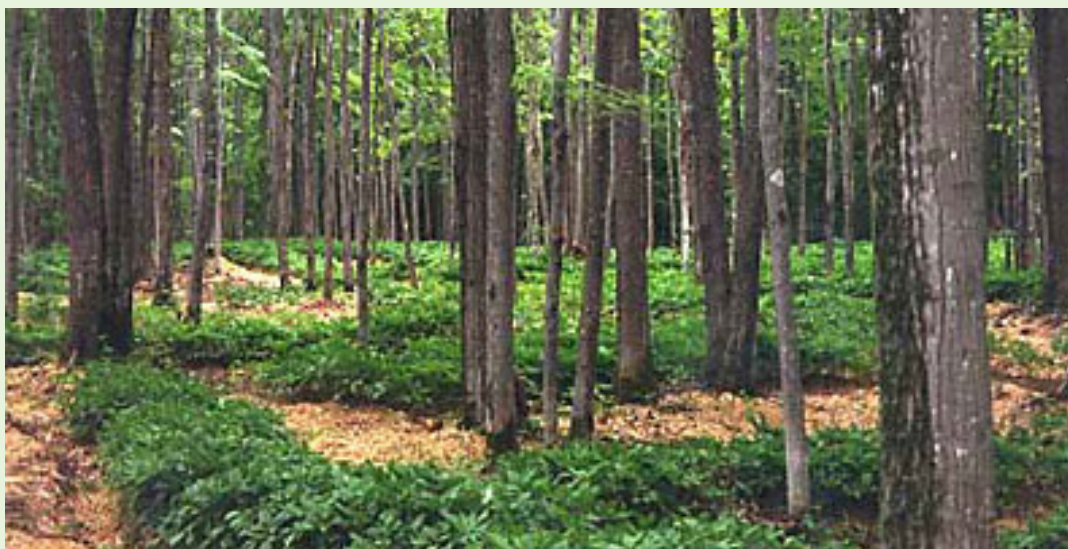
- Improved soil health: The roots from woody plants are able to slow erosion and increase water infiltration. They also add carbon and nutrients to soil and promote nutrient cycling and retention.
- Economic gain: Trees can produce crops, provide valuable wood, or offer material that is needed for livestock.
- Crop protection: Trees and shrubs are able to protect crops from strong winds and pests, as well as extreme temperatures. This allows for higher water efficiency and a microclimate that aids pollination activity.
- Biodiversity Promotion: Planting woody plants introduces more wildlife, which promotes a healthy, diverse ecosystem.

Forest Farming

Overview

Forest farming is the cultivation of valuable crops within woodlands intentionally managed for crop production. Crops grown in this system are often called Non-Timber Forest Products (NTFPs). Though it is difficult to trace its origins, people have relied on resources from forests for centuries, with much intentional use traced back to indigenous peoples in tropical and temperate regions.





Benefits

- Economic gain: NTFPs can provide short-term food and income, especially in forests usually used for timber production.
- Diversification: This practice is often added to forests that primarily produce timber, so growth of new plants allows for healthy biological relationships, and the introduction of wildlife.

Considerations

- There may be negative consequences on forests if not managed for long-term sustainability

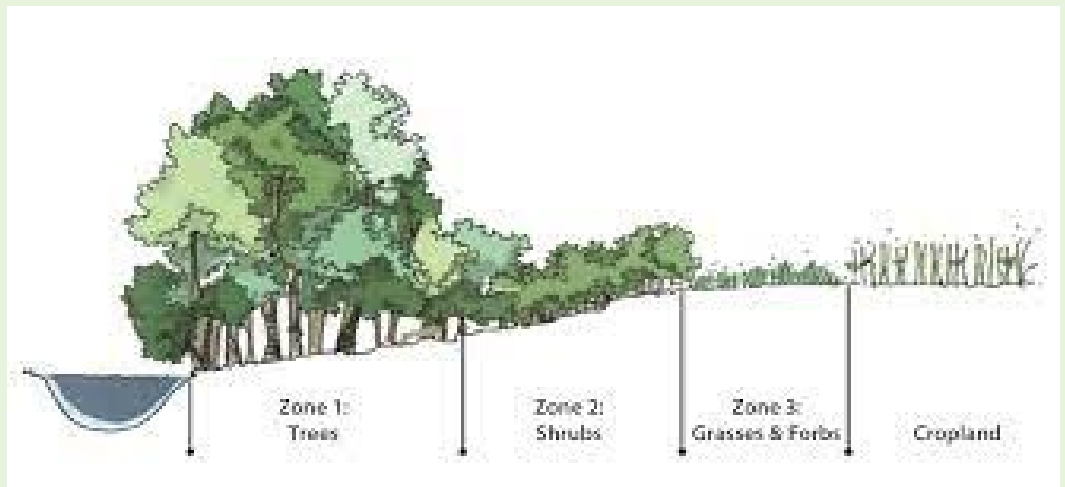
Riparian Forest Buffer

Overview

A Riparian forest buffer is an area next to a stream or river that contains a variety of perennial plants (including trees and shrubs) that is managed to provide conservation benefits. The natural process of plants serving as stabilizing forces has been present for centuries, but with human development, we've seen the tearing down of these natural systems, resulting in environmental degradation. Now, communities are purposefully reintroducing this practice namely for the sake of conservation.

Riparian forest buffers are usually considered in 3 zones:

- Zone 1: Composed of unmanaged forests, this section provides bank stabilization, along with food and shade for aquatic wildlife
- Zone 2: Composed of managed forest, this section absorbs excess nutrients and slows runoff
- Zone 3: Composed of grasslands and wildflowers, this section slows runoff and traps sediment



Benefits

- Improving water quality: Tree root uptake and infrastructure can filter nutrients, pesticides, sediments, and animal waste from agricultural runoff.
- Wildlife protection: Plants provide food and shade for aquatic organisms, as well as food and habitat for terrestrial organisms.
- Improves soil structure: Prevents soil erosion, stabilizing stream banks.
- Floodwater protection: Can reduce impacts of flood damage, as buffer plants facilitate the storage and slow release of water from heavy rains.

Silvopasture

Overview

Silvopasture is the combination of trees and livestock on the same land. This practice is often used with timber growers and livestock producers alike. This practice has been used for centuries by several cultures across the world, long before a name was given to it.



Benefits

- **Livestock health:** Trees can provide comfortable microclimates for livestock, as they provide shade and protection from the cold. Tree components can also be fodder for livestock.
- **Economic diversification:** Adding livestock to a timber forest or valuable trees to a livestock forest can add another source of income for farmers.
- **Silvicultural benefits:** Animal manure and fodder material adds organic matter that improves soil nutrition and tree growth. Livestock grazing also reduces competing brushy species, and reduces forest fire risk.

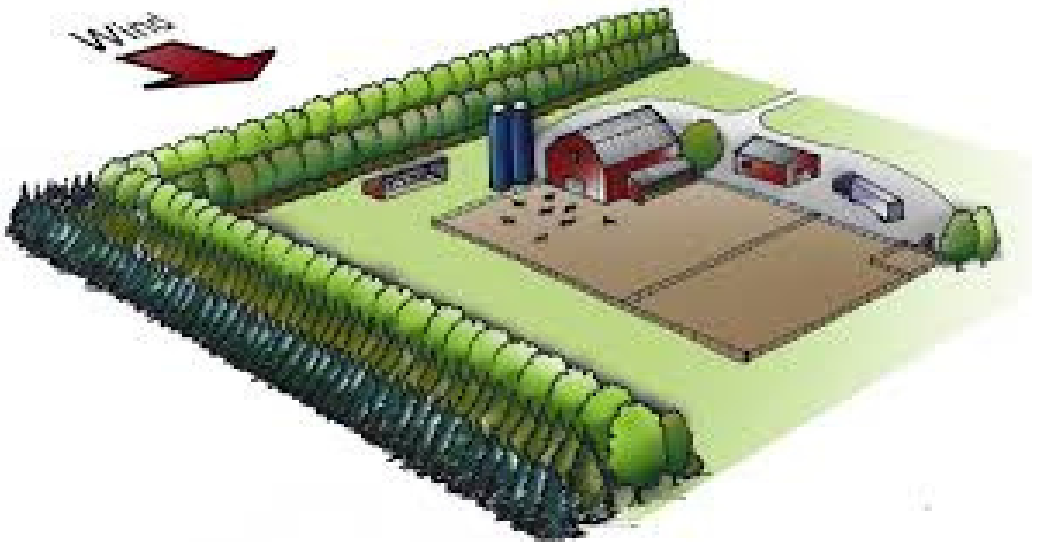
Considerations:

- **Implementation of rotational grazing:** Allowing livestock to graze as normal can result in over-grazed plants damaged trees, and soil compaction
- **Livestock and tree compatibility:** Some animals can be poisoned by certain tree species (i.e. horses and red maple)
- **Requires the cultivation of forages under tree canopy with adequate sun,** unlike woodland grazing, which can be destructive to soil, trees, and livestock when consistently practiced.

Windbreaks

Overview

Windbreaks are the linear plantings of trees and shrubs to protect crops and livestock, and provide environmental and social benefits. Though their purpose is usually to provide protection against the wind, this practice can be implemented to perform several other functions. Origins of windbreaks can be traced back to the 1400's, where the Scottish parliament encouraged their use to counteract the negative effects of agricultural production.





Benefits

- Improved crop health: Trees reduce wind erosion, helps retain soil moisture, and supports temperature controls
- Animal Protection: Similar to silvopasture, windbreaks can improve animal health by protecting livestock from harsh weather conditions
- Reduced carbon footprint: The trees used can be powerful carbon sinks
- Snow Control: Some structures can evenly distribute snow, thus reducing soil erosion and increasing spring soil moisture, while others can retain snow and form heaps.

And so much more!

We've listed the most common agroforestry practices, as stated by the USDA. Yet, there is a diversity of options to choose from when designing your agroforestry system.



Ultimately, your agroforestry system will depend on the goals you have for your farm.

Examples of the Diversity of Agroforestry Practices throughout History:

- The Yoruba of Western Nigeria would grow different crops in close quarters under the tree canopy, making full use of space, and allowing the plants to support each other
- Farmers in Central America would plant several tropical tree species with different growth habits to obtain the benefits of forest structures
- The Hanunoo of the Philippines would leave certain trees when clearing forests, so that the trees could provide protection from excessive heat, supporting the preservation of moisture

Helpful Sources:

USDA.gov

wv.gov

AFTAWEB.org

extension.umn.edu

psu.edu

missouri.edu



This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, through the Northeast Sustainable Agriculture Research and Education program under subaward number LNE22-441. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.