Agroforestry and Soil Health: Silvopasture

Maryland Department of Agriculture
Soil Health Committee
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Outline

• Introduction to USDA National Agroforestry Center
• What is Agroforestry?
• Introduction of Silvopasture
• Discussion and Questions
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A partnership of:

USDA Forest Service  
Research & Development  
State & Private Forestry

Natural Resources Conservation Service
What is agroforestry?

Agroforestry is the intentional integration of trees and shrubs into crop and animal farming systems to create environmental, economic, and social benefits.
Agroforestry can complement other soil health practices.

- Crop rotation
- Forest farming
- Rotational grazing
- No till
- Silvopasture
- Multifunctional riparian buffer
- Alley cropping
- Cover cropping

Photo credit: John Munsell, Virginia Tech
Agroforestry & Soil Health Principles

Minimize disturbance
Maximize soil cover
Maximize biodiversity
Maximize the presence of living roots
Integrate animals

United States Department of Agriculture

Most Common Temperate Agroforestry Practices - NRCS Conservation Practice Standards

- Forest Farming (379)
- Alley Cropping (311)
- Riparian Buffers (391)
- Windbreaks (380)
- Silvopasture (381)

... putting the right plants, in the right location, for the right reason.
Establishment and/or management of desired trees and forages on the same land unit. Silvopasture can involve adding trees to pastures or bringing pasture into trees.


Photo credit: Brett Chedzoy (Cornell) and John Munsell (Virginia Tech)
Silvopasture Systems

• Adding trees
  • Trees into pasture
  • Shade trees
  • Fodder trees
  • Integration with tree crops

• Removing trees
  • Seeding/supporting forage
  • Degraded woodlands
  • Invasive species control
  • Hazardous fuels reduction
What Silvopasture is Not

- Single trees in pastures
- Turning livestock into the woods
- “Feedlots with trees”
- Why not? Problems with root compaction, girdling, soil degradation, parasite problems

Photo by Dusty Walter, University of Missouri

Three photos by Joe Orefice, Yale University
Silvopasture Examples

- Introduce trees to a pasture
- Introduce or enhance forage in a timber or tree crop system
- Most people using silvopasture have some silvopastures and some pastures without trees: it’s not all or nothing
- Different kinds of livestock: cattle, goats, sheep, poultry, etc.

Photo by Joe Orefice, Yale University

Photo by Charlotte Clifford-Rathert, Lincoln University

Thanks to Joe Orefice for giving permission to share photos and examples from Guide to Silvopasturing in the Northeast.
Sheep with black walnut and honey locust

Photo credit: John Munsell, Virginia Tech
Oak trees and cattle
Sheep on a forest edge
Trees added to pasture

Photo credit: John Munsell, Virginia Tech
Sheep in an orchard

Photo credit: Brett Chedzoy, Cornell Cooperative Extension
Hazelnuts and poultry

Photo credit: Reginaldo Haslett-Marroquin, Main Street Project
Silvopasture NRCS Conservation Purposes

- Provide forage, shade, and/or shelter for livestock.
- Improve the productivity and health of trees/shrubs and forages.
- Improve water quality.
- Reduce erosion.
- Enhance wildlife habitat.

- Improve biological diversity.
- Improve soil quality.
- Increase carbon sequestration and storage.
- Provide for beneficial organisms and pollinators.
Silvopasture Economic & Social Benefits

- Reduce animal stress
  - Heat and cold stress
- Increased weight gain
- Increased milk yields
- Diversify income: annual (grazing, hay) and long-term income (timber or tree crops)
- Adding trees to pasture: carbon sequestration
- Adding grazing to the woods: potential managing invasive plants, etc.
- Forages start growth earlier in spring, continue later in fall
- Forage yields higher in heat of summer

Research & graphic by Dusty Walter, University of Missouri
Silvopasture Benefits to Soil Health

- Minimize disturbance
- Maximize soil cover
- Maximize biodiversity
- Maximize the presence of living roots
- Integrate animals

Soil carbon storage is increased at various soil horizons and depths when converting from open pasture to silvopasture.

Silvopasture can enhance nutrient cycling and reduce phosphorus loss and nitrate leaching when compared to open pasture.

Infiltration rates are similar or slightly higher in silvopasture than open pasture.
Silvopasture Challenges

• Need to practice rotational grazing before you use silvopasture
• Protecting trees from livestock
• Need the right site, especially for forest conversions to silvopasture
• May receive less income from livestock and timber (but greater income overall)

Lower photo: John Munsell, Virginia Tech
To learn more about agroforestry:

- Publications: download or request print publications
  - Working Trees Information Sheets: 1 page front and back basics
  - Inside Agroforestry: examples
  - Agroforestry Notes: how-to information
- Webinar library
- SARE project index: what can agroforestry look like
- Join Chesapeake Bay Agroforestry Working Group and/or Northeast/Mid-Atlantic Agroforestry Working Group

https://www.fs.usda.gov/nac/
Questions?

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