



W I L H E L M F A R M F A C T S H E E T

Reasons for Considering Silvopasture Systems in Connecticut and Southern New England

Silvopasture is the integration of trees with livestock grazing and forage operations. In managing a silvopasture system, one is trying to optimize the dual objectives of forage production and tree production, rather than maximizing the production of a single crop. Managing for multiple objectives is more complex than managing for a single purpose. This factsheet qualitatively evaluates the benefits and costs of alternative land uses and explains why silvopasture systems are worth considering, even if the management of them is more complicated.

Reasons to Consider Silvopasture

Several factors may justify serious consideration of a silvopasture:

1. Silvopasture can make a grazing operation more profitable. The presence of trees in a pasture reduces heat stress on livestock during the summer and provides shelter from storms.
2. Trees are a long term investment and it takes time before trees mature and begin to yield crops, such as logs, nuts or other products of value. Silvopasture systems can provide early positive cash flows from livestock operations and environmental benefits, while waiting for tree crops to mature. It also diversifies the income streams from a given acreage.
3. In some circumstances, trees can create a favorable microclimate condition for growing forage that favors the cooler weather of spring or fall, such as Tall Fescue, Orchard Grass, or Timothy.

Management Considerations for Silvopasture

Grazing livestock in the woods was common US practice, but this is not silvopasture. Silvopasture management must consider both the health of the tree as well as the quality of forages produced. Unmanaged grazing among trees can severely damage young trees, can impede natural tree regeneration, cause soil compaction and root damage around the tree, and lead to overloading of nutrients if animals congregate under the tree. Silvopasture must be monitored closely, with careful attention given to the stocking rate and the duration of grazing, so that damage to trees and overgrazing are avoided.

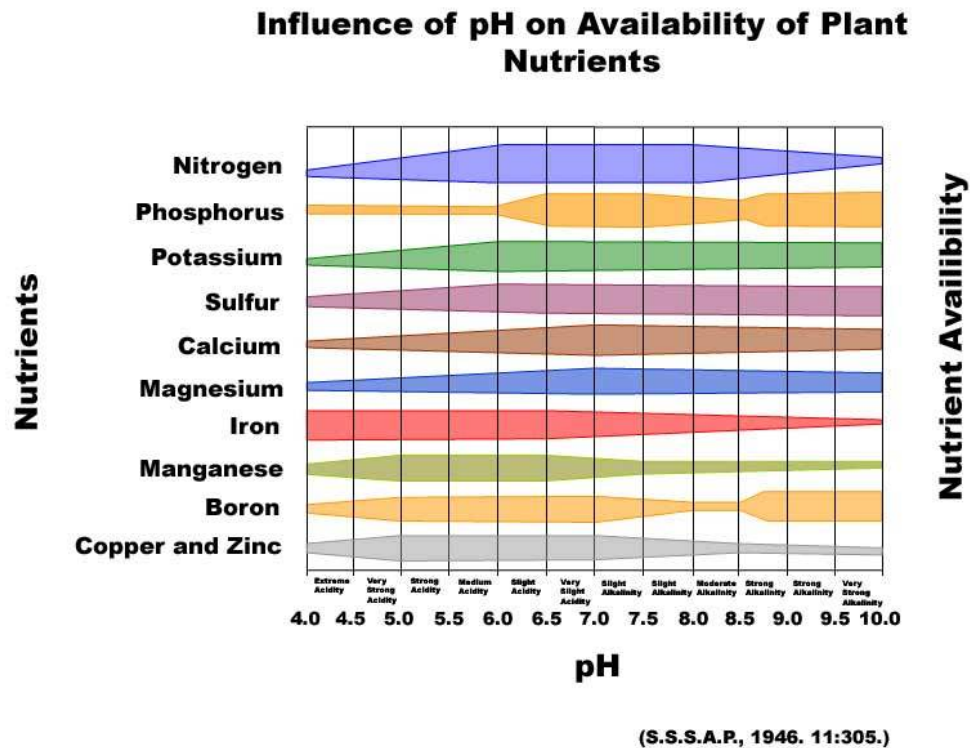
Review Ecological Context, especially Soils

Photosynthesis is the chemical process by which plants make their own food to grow and thrive. Plants convert carbon dioxide and water into plant biomass and oxygen, using energy from the sun. Plants will compete for these resources. In a silvopasture system, the inputs of sunlight and water must be managed to balance net plant growth into a mix of both forage for livestock and wood fiber for tree products. The balance of tree canopy to forage production will shift over time, as trees mature.

Over much of Connecticut and southern New England, trees are the natural succession of vegetation. Open areas that are left unmanaged generally soon fill in with woody plants, starting with weeds, then brush, and eventually hardwood and conifer trees. Silvopasture systems take

advantage of the region’s natural succession toward trees, but management prevents woody plants from overly shading an understory of grasses and other forage and management selects the desired trees.

Soils properties are important considerations when planning a silvopasture site. Plants take up water through their roots and absorb vital nutrients, like nitrogen, phosphorous, potassium, and calcium with this uptake. The ability of a site to percolate and retain water influences the types of plants that will grow and thrive on the site.¹ The availability of plant nutrients varies with soil pH, as depicted in the graph below.² The composition, structure, and nutrient balance of the soil must be considered in selecting and establishing both forage and trees.



Identify and Categorize Benefits and Costs

We are not blindly advocating for farms to change from traditional pasture or forest land uses. The decision to shift to silvopasture is sensible only if the benefits increase and/or the costs decrease for a given site. At Wilhelm Farm, we are considering direct financial benefits and indirect benefits that accrue to us and to the community. Environmental services of watershed protection are enhanced by vigorous vegetation, and a highly vegetated landscape leads to excellent water percolation. This is important if the intensity of weather events increases with climate change. In addition, sustainable land use adds to the rural ambiance of Granby, which is important to the community’s identity and is valued by the town’s inhabitants.

¹ See NRCS/Illinois grazing factsheets on *Species Cool-Season Grass*.

² Graphic from Langston University Agricultural Research and Extension Programs, Langston, OK 73050

The following are two examples from Wilhelm Farm where higher benefit/cost ratios will be achieved by converting from current land use to silvopasture.³ Some of this area has been maintained as pasture, but is often wet, with areas of standing water. Another area was wooded. This is an area of old, upland pasture that filled in over the years with mixed, low-value hardwoods (mainly black birch) and brush (multiflora rose, wild black berries, grape, Japanese barberry, and poison ivy). Neither of these areas generate much positive benefit. By doing nothing with these areas, we are forgoing the values this land could produce, which is why we are converting them to silvopasture.

<u>Pasture to Silvopasture</u>	
<p>There are ~2 acres of wet pasture where we have begun planting fast-growing, hybrid poplar (cottonwood) trees.</p>	
<p><i>Benefits</i></p> <ul style="list-style-type: none"> • The trees will pump water and transpire it into the atmosphere, which dries the surrounding soil and makes it more productive for grass production. • Poplars trees can be used to produce poles; smaller branches and limbs can be cut for use as animal fodder; trees can be chipped and used to produce biomass energy. • Poplar trees can be coppiced and used in the greenwood crafts industry. • Adding trees enhances the diversity of the landscape and improves its attractiveness to animal and bird habitat. 	<p><i>Costs</i></p> <ul style="list-style-type: none"> • Minimal costs to establish; \$60 per hundred for hybrid poplar cuttings.⁴ • Time needed to plant tree seedlings will depend on the area and difficulties, such as rocks or competing vegetation. • Mowing grass lanes 3-4 times a summer with a DR Field machine takes about 2-3 hours each mowing, plus the cost of fuel and machinery maintenance • Deer are not a major problem for us, because there is dense browse nearby. For others protection of seedlings may be a cost. • Applications of lime are needed to bring the soil pH to a level that will encourage favorable forage plants and discourage sedge.
<u>Woods to Silvopasture</u> ⁵	
<p>There are ~2 acres of low-value hardwoods and brush on wet soils. These trees will not produce returns from growth or quality improvement. Conversion of this area to forage grass is more likely to yield investment returns. There are some scattered, naturally regenerated oak in this area that we have protected in tree tubes and are a higher value tree species. This area also includes about an acre of white pine, as well as a few groves of dense hemlock, both of which can provide shade and shelter to livestock.</p>	

³ We will discuss benefit/cost ratios, present net worth and other investment measures in a forthcoming factsheet.

⁴ The use of hybrid poplar will be discussed in Wilhelm Farm Factsheet No. 3, *Pasture or field into silvopasture – guideline & steps*, which will be released in March 2018.

<i>Benefits</i>	<i>Costs</i>
<ul style="list-style-type: none"> • Opening the area so that sunlight hits the soil allows grass and herbaceous plants to germinate and grow. • Creating more open areas will enhance bird and wildlife habitat. • Removing low-value hardwood stems provides firewood or, in our case, substrate for our developing mushroom operation. • The pine will provide cash returns at maturity in 10 to 20 years. 	<ul style="list-style-type: none"> • Time and expense to remove the low value trees. • Expenses of soil testing, soil amendments, site preparation, and grass seed. Establishing pasture in formerly wooded areas can be a challenge. • Time and expense to to thin and manage overstocked thickets pine and hemlock.

Summary

In each case we are converting marginal lands that are not producing much value to land uses that will contribute more to the overall productivity of the farm. Our summary points are:

1. We are moving into silvopasture by beginning on our least productive lands.
2. The areas in these cases studies are relatively small, so the costs in terms of both cash expense and time are not high, the risks are low. The costs/benefits ratio are positive for us.
3. The target silvopastural systems will improve both the forage and the trees on this part of our landscape.

References

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- Robinson, J. L. and Clason, T. 2000. *From A Pasture to A Silvopasture System*. National Agroforestry Center AF Note 22. 4 pp.

⁵ Wilhelm Farm has other small areas, like the old chicken and barn yards and the livestock path to the main silvopasture unit, which are like the *Woods to Silvopasture* example.