

Wish you had shade? Plant some trees!

By Brett Chedzoy

The past few articles have covered the process of enhancing woodlands to make productive silvopastures.

But practically all grazing farms have the potential to plant trees to develop open pastures and fields into silvopastures to benefit livestock and do more with the same land base. Planting can also be used judiciously to establish new trees in current silvopastures where natural regeneration of older or dying stands is insufficient.

So what are some of the benefits of planting trees?

Trees will provide shelter and shade benefits for livestock. I manage several of the mixed conifer plantations around my farm as “living barns” that keep animals comfortable during extreme winter weather, saving us tens of thousands of dollars compared to roofed shelters.

They can provide a future supply of timber products. I have an affinity for black locust, which has supplied me with fence posts worth many thousands of dollars.

Some trees, like honey locust, can generate a large amount of feed value per acre from their nutritious seed pods. Examples of other trees with nutritious fruit (known as “mast”) include oaks, hickories, apple and other stone fruits, such as peach and plum.

Trees also play important roles in keeping soils healthier, water cleaner and attracting beneficial bugs, birds and other critters in the grazing environment.

So tree planting can be rewarding, productive and profitable.

Planning and preparation

However, like other aspects of silvopasture, planning and preparation are keys to success. Numerous online publications address the “how-to” of tree planting. One such guide can be found by doing a search for “Cornell reforestation bulletin”.

Even if you are not a person who normally reads the instructions before assembly, it would be worth the time to pick up one of these technical resources and become familiar with the essential steps — proper species selection, site preparation, planting methods and maintenance of young trees — before a planting project.

Establishing trees in a dense sod environment full of herbivores presents challenges beyond the norm. This article will focus on additional considerations for success in planting trees for silvopasture applications.

For more than 30 years at my farms in New York and a ranch in Argentina, I have been planting trees where I didn’t have them. Here are the teachable moments of that learning curve:

1. Diversify the species mix. The spacing and orientation of the trees, as well as the mix of species used, should be carefully considered in the planning stages.

In hindsight, one of the few things I did well in the early phases of tree planting was to mix a lot of species. Fast-forward a few decades, with at least a dozen major pest issues that were not on the radar at the time of planting, and I still have plenty of trees despite losing entire species to insects, disease and weather.

2. Design the planting to match the objective. If shade is the primary objective, consider orienting rows of trees where they will maximize afternoon shade, but not cause animals to clump together — especially around sensitive areas like streams. A silvopasture planting should establish enough trees to provide extensive shade across paddocks so that animals don’t concentrate in specific areas.

Other objectives might include species for fence posts, nut trees for mast and cash crops, or timber species for lumber production. Note that the trees with the most valuable lumber may not always be the most profitable to grow. More on that in the final section.

3. Pick the right trees for the right spot. This starts with assessing soil type and site quality, and then selecting species that will grow well in those conditions. As a general rule of thumb, all trees grow well on a good site. The options become far fewer for sites with heavy or somewhat poorly drained soils, or on droughty or infertile soils.

If you're struggling to find good information on what will grow well on your planting site, local forestry experts (consulting foresters, Extension, SWCD or state forestry personnel) can help reduce costly mistakes. Trees planted "off-site" may grow well initially, but the risks of stagnant growth, pest problems and mortality increase with age.

A common example here are the red pine plantations that were planted on abandoned farm fields with heavy soils and shallow hard pans. Red pines do best on deep, well-drained soils. So while those plantations grew well initially when the root systems were small, they gradually fell apart as the older trees suffered from the inadequate rooting depth and drainage.

Another aspect of selecting the right trees for the location is to keep in mind that some trees can spread to areas where they become a nuisance. Black locust is one of my favorite trees for silvopasture plantings, and it holds great promise as a timber cash crop in the Northeast. But this species can spread through seeds and root suckering into roadways, rights-of-way and other spots where I didn't want trees.

4. Preparation and maintenance are of utmost importance. Tree planting success is highly dependent on what's done both *before* and *after* planting. I've paid a heavy price for cutting corners in these areas. Herbaceous plants are very effective in keeping young trees from invading their turf, so reducing this competition before planting is key.

However, spraying or tilling the sod will awaken the seed bank, quickly filling the void with weeds that compete belowground for rooting space and above the ground for sunlight. Grasses and weeds also provide habitat for rodents that want to feed on the seedlings.

After planting, the work to get the young trees established is just starting. Mulching around the seedlings to suppress weeds and lock in moisture may be necessary and cost effective, as will installing protective shelters. Watering during periods of drought will also help, and may well be critical for seedling survival.

Shelters can range from small tubes around the bases of seedlings to protect them from girdling by rabbits and rodents, to large tubes that deter taller herbivores such as deer. In many areas, deer can destroy a plantation of unprotected trees.

In a pasture these shelters must be further reinforced by electrified or barbed wire fence, or a barbed cage to prevent grazing animals from using the tubes as a rub until the trees are large enough to resist damage. Protecting a group or row of trees with a fence sufficient for grazing livestock and deer will usually be less costly than protecting individual trees with a cage.

A third option still in the research stages at Cornell University is to build exclusionary "walls" from nearby logging debris or the remains of invasive shrubs that have been removed.

5. Don't exclude animals for longer than necessary, as carefully managed grazing can be a very practical tool for maintaining young plantations. The livestock showed up at my farm years after my first plantings, and I now realize that I should have started flash-grazing my plantations much earlier to control the invasive plants and vines that were able to get a foothold after the first few years of maintenance mowing stopped.

Just how soon a site with new trees can be grazed again depends on many factors, including the type of livestock and trees, the duration of the grazing, and the season.

In young plantations, avoid grazing when trees are particularly susceptible, like during spring "bark slip" season and when the trees have lush new growth in early summer.

6. Plant trees that are going to be useful and of value, but also consider the economics. As an Extension forester, I often receive inquiries about planting high-value sawtimber or fruit and nut species due to the perceived future value.

However, these trees usually cost significantly more to get established, and the return on investment may not be justified when evaluated on a Net Present Value basis. If the main purpose for planting is to create shade and shelter, then consider species that are less expensive to grow, like conifers.

The economics

“Will it pay?” is a complex question to answer for silvopasture planting investments because the benefits usually encompass more than just the future value of the timber products, which in themselves are hard to forecast.

But to put things in perspective, the investment to create silvopastures through tree planting starts at around \$500/acre, and may cost up to 10 times that amount for more elaborate projects.

Planting costs include site preparation, seedlings, planting tools and labor, seedling protection, weed management for up five years, periodic maintenance of seedling protection systems, and replanting if seedling mortality falls below an acceptable threshold.

This threshold will depend on how many seedlings were initially planted, and how many are ultimately needed to reach the planting objective. Many expensive plantings have been lost because the shelters installed to protect the young trees were not properly maintained.

When factoring costs, also consider that some or all of the planted area may need to be temporarily removed from the grazing systems until livestock can be safely reintroduced.

All told, gaining a return on your investment will take time.