



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 ENE23-187. 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.



Planting Plan

Plan Date:

Project ID:

Contacts

Landowner:

Address:

County:

Phone:

Email:

Implementation Partner: Trees For Graziers

Address: 2860 Best Rd Morgantown, PA 19543

Email: contact@treesforgraziers.com

Phone: 484-796-1513

Funding Partner(s)

Address:

Email:

Phone:

NRCS Silvopasture Practice Definition

Establish and manage trees on the same land unit as forages and livestock

Purpose

- Provide forage, shade, and/or shelter for livestock.
- Improve the productivity and health of trees/shrubs and forages.
- Increase carbon sequestration and storage.
- Improve soil quality.
- Improve water quality.
- Reduce soil disturbance and erosion.
- Enhance wildlife habitat.
- Improve biological diversity.
- Provide for beneficial organisms and pollinators.

****Insert Maps here (soil types, topography)**

Planning Step 1: Questionnaire

This section will be filled out by the farmer prior to meeting with TFG staff so that we can more fully understand their unique context and goals. The farmer should first read through “The Grazer’s Guide to Trees” to develop a basic knowledge of silvopasture and how it can be applied to their farm. Before their first visit, a TFG staff will review this section, and can address any unanswered questions together with the farmer.

Primary Questions

- How familiar are you with silvopasture and other agroforestry practices?
- What makes you want a silvopasture?
- Are you rotationally grazing your livestock?
- Are you currently practicing agroforestry?
- Are you interested in incorporating any other agroforestry practices into your management plan besides silvopasture?

Vision (What are you currently doing and where would you like to be?)

Describe your current farm operation in five sentences or less.

Describe where you would like your farm operation to be in five sentences or less.

Values (What is important to you in farming and life?)

What motivates you to farm the way that you do?

How does silvopasture integrate into your major beliefs and values?

Goals (How are you going to get to your vision?)

Economic Goals

- What goals do you have regarding decreasing your expenses through silvopasture? For example, reducing feed costs, reducing heat stress-related vet bills, reducing cost of spreading manure because animals spend more time on pasture, becoming more self-sufficient in growing more of your own food (through tree crops) and fuel (fire wood from pruning), etc.

- What goals do you have around increasing or diversifying your farm income through silvopasture? For example, adding new tree crops for sale, increasing the carrying capacity of your land, creating new opportunities to bring more people on the farm, etc.

- Do you expect silvopasture to unlock business opportunities for you? For example, transitioning to grassfed milk, getting certifications like Regenerative Organic or Certified Humane, strengthening your brand for customers, etc.

Ecological Goals

- What goals do you have about wildlife habitat? For example, creating food and shelter for bees, pollinators or birds, increasing habitat for hunting, etc.

- What goals do you have for soil health? For example, increasing soil life, increasing soil mycorrhizal fungi, increasing soil carbon and organic matter, nutrient cycling from deeper soil horizons, etc.

- What goals do you have for water quality? For example, reducing overland runoff into water bodies, having shade in the pastures that gives an alternative cooling strategy for cows who would otherwise stand in a creek for cooling, etc.

Other goals. Describe other goals you might have. Others have mentioned having a visual barrier from neighbors, a barrier to prevent pesticide drift, the simple ability to have a picnic in the shade, the opportunity to leave a physical legacy, etc.

Social Context

Who are the key stakeholders involved with your farm or in the establishment of silvopasture? Can be landowners, family members, employees, etc.

Who is the final decision maker ?

Who will be most actively involved in the establishment and aftercare of the silvopasture system?

Who is the primary grazing manager and how many others are involved?

What considerations would be made regarding your neighbors? For example, create a privacy border, spray barrier, keep trees away from their boundary, etc.

Do you have any aesthetic concerns, wishes, or considerations with planting a silvopasture? Do you want the silvopasture to look a certain way?

Land Context and Grazing Management

Share what you know of the land use history, particularly how the land may be degraded from prior (mis)use.

Total farm acres

Acres grazed

Acres in crops (non grazing?)

Main crops grown

Acres in hay

Acres in woods

Acres in other usage

Do you keep or intend to keep bees?

What types of livestock are grazing in your pastures? (Dairy cattle/beef cattle/sheep/hogs/broilers, etc.)

What breed(s) of livestock do you have on your farm?

What, if any, livestock species do you plan on adding in the future?

Do you keep animals off pasture, like poultry or hogs in barns?

If so, would you like to eventually incorporate them into your pastures, and what would be your main goals of doing so? For example, less manure management, making use of mast crops, better animal welfare.

Size of herds/flocks

Do you have a grazing plan? If so, was your plan prepared professionally?

Average size of daily paddock? Does it vary by the season?

How often livestock are moved?

Main forage species

Do your livestock currently have regular access to a wide variety of browse (tree or shrub) species? If so, explain.

Do you have trouble with forages that livestock don't like to eat, like toxic endophyte fescue or reed canary grass? If so, explain.

Do your animals have significant parasite issues? If so, explain.

How many days do you graze per year on average?

How long are you able to graze stockpiled forages?

How do you currently avoid heat stress?

What shade options do you have?

What shelter/windbreak options do you have?

How much hay do you feed during summers?

How severe has drought been? What do you expect going forward?

How do you plan for and manage in a drought? Destocking, buying hay, etc.

What issues do you experience with downpour or flooding events?

What are your winter grazing protocols (i.e. sacrifice lot, keep them in the barn, bale graze, etc.)

How do you provide water to your livestock?

What efforts do you take to prevent damage to sensitive ecological areas? (This could relate to keeping them out of streams, out of wet areas unless it's a dry period, stream crossings, etc.)

Would you be open to excluding large livestock (cattle, horses and goats) from the planting area for a few years while the trees get established? If you plan on keeping large livestock away from the trees for several years while the trees get established (by haying or cropping in between, running smaller livestock that won't damage the trees, or keeping the large livestock several feet removed from the trees), it opens up options for protecting the trees inexpensively.

Are there major changes to grazing management coming up? If so, explain.

Is your farm organic, transitioning, conventional, etc?

Infrastructure and Access

Do you have underground utilities/piping in your pasture? (Waterlines, gasline, well, tile drainage?)

What is the width of the widest machinery that will be accessing your silvopasture area?

Do you have any access considerations for your family or others such as walkways, picnic areas, etc.?

What headlands (spacing) would you like to have at the end of each row of trees?

Do you use animal lanes or how do you move animals between fields?

Any other considerations?

Tree context

How familiar are you with trees in general?

What tree species already grow on your farm?

What tree species already grow in your planting area?

Have you planted trees in your pastures before? If yes, what has your experience been?

How do you currently use trees on your farm? (shade, fodder, windbreak, firewood, food etc)

Do you have existing woodlots? If so, would you like to convert any to silvopasture?

Enterprises

What types of enterprises do you currently have on the farm?

Where do you sell your products? (on-farm, farmer's market, wholesale, etc)

Are you part of a larger brand or cooperative? (like Organic Valley, Vital Farms, etc.)

Do you want to add new tree crop enterprises to the farm? If so, which ones?

When would you like those new enterprises to be creating work/revenue? For instance, just a few years from now, or 15 years from now when the kids are old enough to help.

What scale would you like tree crop enterprises to be? Small retail, large wholesale, somewhere between?

Are you interested in growing timber trees? If so, for what use? For instance, pine timber, pulp wood, high quality hardwood veneer, fence posts, etc.

Would you like to plant trees as living fence posts?

Would you like to use existing trees as living fence posts?

Are you interested in tree crops for home use? Like chestnuts, walnuts, fruits, etc.

Silvopasture Goal Priorities

Of the following issues on your farm, rate in terms of your priority (Summer heat stress, Winter cold stress, lack of summer fodder, lack of winter fodder, Income diversification)

1. _____
2. _____
3. _____
4. _____

Tree Species Selection

Check the tree species you're interested in:

- Honey locust
- Persimmon
- Black locust
- Hybrid Poplar
- Hybrid willow
- Mulberry
- Oaks
- Apples
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

Do you have preferred sources for seedlings?

Do you have any preferred varieties?

Plan Details

What are your priority areas? For example, south-facing slope, day pastures, cold windy areas, saturated soils, etc.

What soil conditions are in the area to be planted? (Saturated, well-drained, dry, etc.)

Explain the topography of the area to be planted.

Is any of the area to be planted in a floodplain?

What direction do winter winds and summer storms typically come from?

How many acres would you like to plant with trees?

Do you have a sense of how many trees you would like to plant? Or the spacing you'd like between trees.

Are there things about your farm that make planting trees difficult? (really steep or rocky, wet or dry, etc.)

How would you rate your deer pressure? (None/Low/Moderate/High)

Funding Sources and support

Indicate which of the following funding sources you are open to

- Self funding
- Loans
- NRCS (EQIP or CSP)
- Private grant funding
- Carbon credits

Have you used funding through NRCS (EQIP/CSP) before? If yes, what was your experience?

Are there groups in your area that might support silvopasture plantings? Whether through cost-share, free trees or shelters, volunteer labor, etc.

If you are hesitant about using outside funding, please share.

If you will bring your own money to this project, what is your rough budget?

Will you be making a large investment in equipment or farm infrastructure in the near future? (Could be helpful if pursuing a loan for silvopasture)

Timelines

What timeline do you envision for planting? All at once, spread out over several years, etc.

Would you prefer spring or fall planting? What makes you prefer one over the other?

Do you plan on growing any of the planting stock yourself, like willow cuttings?

Prep for Consultation

What other major factors should TFG be aware of to plan this project? (For example, major financial constraints, imminent farm transition, etc.)

What goals do you have for a consultation?

What are the main questions you would like to ask during consultation?

Planning Step 2: Consultation

This phase of the plan development process will be completed by TFG after the above questionnaire is filled out by the farmer

Clarifying Questions from Step 1

Vision, Values and Goals

Social Context

Land Context and Grazing Management

Infrastructure and Access

Tree Context

Enterprises

Silvopasture Goal Priorities and Tree Selection

Plan Details

Funding Sources and Timelines

Tree Protection

What size of tree shelter will you use?

- Short (ideally to protect from chickens, or in combination with electric fencing to keep livestock away)
- 5' (works for deer and sheep, but not ideal for cattle or goats)
- 6' (best for cattle and goats)
- 6' + extender (horses and mules)
- None

How will you protect the tree shelters

- Electric fencing
- Barbed wire
- Other (explain)
- None

Will livestock need to move between rows of trees protected by electric fencing? If so, determine the fencing method (overpass, bridge or underpass).

Are you interested in being responsible for applying mulch to the planting or would you prefer TFG to complete this service?

Do you have access to any of the following mulch types?

- Wood chips
- Compost
- (Spoiled) hay
- Grass
- Other (explain)

Would you be open to TFG utilizing on-site grass as mulch if applicable?

Do you have machinery for loading and/or spreading mulch? If so, are you comfortable with allowing a TFG machine operator access to that machinery?

Where would you prefer to have mulch staged that is easily accessible?

Tree Selection

Tree species	Generic seedling	Improved seedling	Grafted/Clone	Cutting

Tree species pattern										
Layout 1										
Layout 2										
Layout 3										
Layout 4										
Layout 5										
Layout 6										
Layout 7										
Layout 8										
Layout 9										
Layout 10										

Tree Species Pattern Notes

Number of each species/type				
Tree species	Generic seedling	Improved seedling	Grafted/Clone	Cutting
Total Number of Trees				

Responsibilities

Task	Party Responsible
Developing Plan	
Acquiring supplies	
Laying out site	
Site Prep	
Installation Labor	
Mulch installation	
Verification	
Funding	
Follow-up care	
Tree Replanting as needed to maintain minimum survival rate	

Planning Step 3: Follow up (Finalize the plan with the client.)

This step is to be completed when TFG visits the farms

Onsite Planning Checklist

- Verify with landowner
 - boundaries of project on the map
 - # of trees
 - species of trees
- Identify which line(s)/contours will be used as starting point for laying out rows
- Determine where the first row(s) start

- What is the width of the turnaround area at the end of tree rows?
- What is the width of the area from the fence lines to the tree rows that run parallel?
- Verify specific tree pattern
- Determine whether any tree rows need to be skipped to grant machinery access
- Determine whether there are any waterlines or buried infrastructure to avoid
- Verify whether trees will be protected with electric fencing or barbed wire.
 - If electric fencing, do we need to run fencing underground to allow for machinery access?
 - Will livestock need to move between rows of trees protected by electric fencing? If so, verify fencing method to use.
- What will be used to dig the holes? Shovel/hand auger/machine auger
- What side of the tree does the landowner want the stake?
- Find out from landowner what part of the pasture will be grazed first so this section can be prioritized during the project
- Verify which type of mulch to use (grass, woodchips, or other)
 - What mulch, if any, does the landowner have on hand or have easy access to?
 - Does the landowner have a means of transporting bulky mulch?

Project Plan Summary

Projecting the phases of planting				
Phase	Season	Year	Focus areas	Rough acreage

1				
2				
3				

Important Site Conditions to Consider

Site Prep Required

Planting

- Total Acres planted
- Number of trees:

Tree Protection

- Shelter Type
- Shelter Protection
- Vole Guard
- Mulch type

Proposed Planting Season

Projected planting date range

Project Costs			
Item	Rate Per Item	Number of Items	Total
Planning	\$1200	1	
Hershey Honey Locu	\$6		
Black Locust			
Hybrid Willow			
Hybrid Poplar			
Persimmon			
6ft Tree Shelters			

5ft Tree Shelters			
Flagging per tree			
Labor per tree			
Spiral Guards			
Mulch per tree			
Vole Deterrent			
Electric fencing (per linear foot of row)			
Aftercare. Per event (2 annual years 1 and 2. 1 annual years 3 and 4)			
Initial Total			
Landowner labor to install mulch			
Landowner providing mulch material			
Machinery/Equipment (equivalent to a skid loader rental to install the mulch and dig the holes for the trees)			
Total			

Implementation Checklist

- Plan approved by the landowner
- Flags laid out and approved by landowner
- Shelters to the site
- Trees to the site
- Bare root trees dipped
- Seedlings pruned as needed
- Stakes installed
- Holes dug
- Trees planted
- Vole guards installed
- Tubes installed
- Ties installed tightly
- Shelter protection installed
- Mulch installed
- Final walkthrough and approval by landowner
- Discuss maintenance schedule with landowner

Aftercare

Getting the trees in the ground is of course only the first step. The real goal is not to get them planted, but to have them mature to a stage where they can contribute to the farm. The first year is absolutely the most critical to tree survival, one more reason to not plant too many trees at once, since you don't want to be overwhelmed with aftercare. That said, good and thorough care in the planting phase will make aftercare a breeze.

Trees For Graziers cannot stress enough how important it is to be checking in on your trees the first few years. It really doesn't take much time (less than a minute per tree unless there's major issues), but it does need done.

Inspect trees for any damage in the course of rotating livestock through the paddock, along with any damage from wildlife, rodents, insects, disease, etc. Each tree should be checked for problems twice annually in the first two growing seasons, and then once or twice annually thereafter for the following 2 years.

Survival and Replacement Policy

- When planting trees into the challenging conditions presented by actively grazed pastures, there will always be some portion that do not survive. When nature plants trees, it uses thousands or even millions of seeds to get just one mature tree. We have much higher success rates, but still need to account for mortality on every project.
- TFG is responsible for replanting trees at TFG's expense **only** if TFG is placed in charge of the entire project, including planning, tree selection, planting and aftercare, so that TFG can ensure that our quality standards are met throughout the process.
- If the above criteria are met, TFG will keep survival above 80% for 12 months after planting. Anything under 80% will be replaced at our expense to reach the 80% threshold.
- The above is voided by acts of God, including severe drought, storms, flooding and the like.
- Any mortality after 12 months cannot be covered by TFG. After 12 months the trees will have had plenty of chance to establish, and later mortality will be from causes other than potential mistakes on the part of TFG in the process of acquiring and planting stock.
- Any mortality that is determined to be caused by landowner neglect (for instance, not keeping electric fencing hot, giving livestock access when trees are unprotected, etc.) cannot be covered by TFG
- Because TFG cannot be at the farm all the time for minor repairs, the farmer is responsible for making repairs if livestock damage trees or tree shelter, and before livestock are given access to those trees again. If the farmer gives access to trees that have their protection compromised, and those trees are killed, TFG cannot be held responsible.

Aftercare Checklist

- Determine whether tree is alive
- If dead, mark the tree shelter for future replanting
 - Tally mortality by species and cause
- Remove weeds inside the tube
- Reset stake and tube as needed
- Replace broken stakes as needed
- Cut top of tubes if needed to reduce rubbing damage
- Remove stakes for trees that can support themselves
- Open up or remove tubes for trees that do not need protection from rubbing
- Apply vole deterrent
- (Optional) Starting in year 2, apply fertilizer
- (Optional) re-apply mulch after initial application breaks down