KHUBA INTERNATIONAL

Khuba International's

SILVOPASTURE GUIDELINES

To Landowners Experiencing Historical and Present-Day Land Disenfranchisement

Thank you to our sponsors:

Cornell Cooperative Extension
Tompkins County

U.S. Endowment
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SCJ General Services

TABLE OF CONTENTS

Why Would An Economically Marginalized (EM) Farmer Be Interested In Silvopasture?

This booklet was developed as a collaboration between Khuba International, Cornell University Cooperative Extension of Tompkins County, and Edwards Mother Earth Foundation as a means to support the vital community, ecological, and socially beneficial economic work of forestland owners at the margins of society.

GENERAL PROS

Ability to work with culturally important species of plants and animals.	High revenue potential/acre (good for small landholdings). This is helpful for EMs who may not have access to increased funding needed to purchase large plots.	Higher animal health and more climate resilient.

High potential for ecosystem service provision/acre.
(carbon sequestration, water retention, biodiversity)

Can be established on marginal lands with less-than-optimal soil or slope conditions. Agroforestry benefits from good soil and slope as well as any other system, however, it does offer management and species options that can realize cultural or economic value in these often overlooked areas.

POTENTIAL CHALLENGES SPECIFIC TO EMs

- Because of long-term systemic exclusions by the USDA and other public and private funding resources, EMs may not be familiar with the funding resources that are available or with the specific bureaucratic processes supporting successful grant applications.
- EMs may not be familiar with the grant-writing process and may need support from those with grant-writing experience.
- Loans, grants, and conservation payments all present limitations and challenges for agroforestry in general and underserved, marginalized communities in particular. Complex bureaucratic hurdles, programs favoring simple enterprises with short-term payoff, and the requirements of cost-share and partial reimbursement, often place these programs out of reach of underserved, undercapitalized, and marginalized farmers. Similar challenges apply to the limited sources of non-USDA funding, including grants, loans, and private investment. See Reference #3 p.11 for further information on racial justice in agroforestry.
- Since funding entities tend to prioritize applications that bring together community partners, EMs may not be as connected with strong partner networks as are other organizations.

There are an increasing number of agroforestry support organizations who are making service to EMs a priority, including the following:

1

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USDA US Forest Service Inflation Reduction Act grant provides funds to support EM forestland owners, adding in unrestricted funds from the US Endowment for Forestry and Community's Forest Fund to support EM forest retention work. Strong Roots, New Growth program provides network-building, resourcing, and technical assistance to marginalized forestland owners.

khubaintl.org/strong-roots

2

CORNELL COOPERATIVE EXTENSION Tompkins County

ccetompkins.org

3

SOUL FIRE FARM Braiding Seeds Fellowship

soulfirefarm.org/braiding-seeds-fellowship

4

CORNELL COOPERATIVE EXTENSION Broome, Tioga, Onondaga, etc.

cals.cornell.edu/cornell-cooperative-extension

5

INTERLACE COMMONS

interlacecommons.org

6

SAVANNA INSTITUTE

savannainstitute.org

7

NE SARE

northeast.sare.org

8

PASA

pasafarming.org

9

The Catalyzing Agroforestry Grants Program (CAGP) is an initiative funded by Edwards Mother Earth Foundation (EMEF). Direct financial support is available through the program for farmers who seek to join our effort to mitigate climate change through use of agroforestry applications. Agroforestry practices sequester carbon, sustain productive and healthy farms and forests, protect water quality, regenerate soils, and enhance biodiversity.

catalyzingagroforestry.org/cagp

GENERAL CONS

LABOR AND KNOWLEDGE-INTENSIVE

- While EMs tend to have adequate sources of ancestral/Indigenous knowledge, sources of as-needed mentorship and technical assistance can be hard to come by and challenging to access given the time constraints of EM forest business owners.
- Though the per acre revenue is high, the overall revenue for the ecosyst EMs services payments associated with silvopasture operations is low for small acreages.

EXPENSIVE TO ESTABLISH AND MAINTAIN

- Tree species and animal species can be expensive to purchase and difficult to find reputable sources.
- The establishment timeline can be slower than what is expected due to the iterative nature of agroforestry.
- Tree species and other shrubs, perennials, often require multiple years before generating adequate yield. They sometimes can be non-eligible for ag-tax assessments.
- High failure rate in some tree species requiring replanting.
- High costs of tree/plant protection, including fencing, necessary to prevent deer browse and other pest damage. Some germplasm/plant sources have high mortality, related to point one, the better material tends to cost more.
- Irrigation is expensive to install, but may be necessary for the success of some tree plantings; in upstate New York in some years there is adequate rainfall to establish trees, but supplemental water during the first year after planting is often needed.

Siting Considerations

Like their cousins, the white-tailed deer, ruminants such as sheep and goats love forest landscapes. In them, they find the nutritional variety and multi-seasonal forage they need for a healthy body and a high-quality wool coat. Forests also provide ruminants with a variety of physically and mentally engaging activities and a beautiful home landscape for them to enjoy. If you want content and healthy sheep and goats, a silvopasture site may be the right solution for your forest/farm lifestyle and/or business.

Finding a piece of land appropriate for planting trees or converting to silvopasture requires a thoughtful approach. In your considerations, it is important to include:

1. Planning for how you will conserve existing tree species and the integrity and health of the forestland in your care, who you will partner with and invite to steward your silvopasture landscape and operation with you, and what your goals (personal, economic, academic) are and how you will achieve them.

2. Planning for how you will convert site types other than existing forestland to silvopasture. What exists there currently? How do you protect what is important to protect there? Who will do the work of the conversion? What types of trees and other forage plants will you plant there? What types of trees and other plants will you want to plant there that you don't want your animals to eat? How will you protect some plants from being eaten in a silvopasture site?

3. If you are purchasing land to create a silvopasture landscape, consider the location of this land to existing services and technical assistance hubs, veterinary services, plant and tree nurseries, land management education facilities, butchers (for meat operations), wool processing (for fiber operations), etc.

Land access considerations specific to EMs: Lower cost land may have challenges for farming (such as wetlands) or access (roads to enter property).

EMs may encounter racism and/or sexism and various forms of hostility from neighbors and residents in the local community.

Racially homogenous municipal governing bodies many times fail to understand the scope and mission of EM organizational priorities and **do not act to remove systemic barriers to land** and business development for EM-owned properties. This is important also for technical service providers, who are already hard to find, and harder to find ones with silvopasture knowledge, and who are necessary to write conservation plans and forest plans required by NRCS and other funders.

Changes to the scope and direction of a silvopasture plan can occur at any time. It can be difficult to find alternate siting options if one site fails on a property when the overall acreage is limited. Alternative options may not exist on small landholdings.

Forest Conversion or Pasture Planting Approach

GENERAL CONSIDERATIONS, BARRIERS, AND CHALLENGES WITH...

Forest Conversion

- Although experts know that forest conversion can be positive and overall a much better option for many forest plots than no management, an overall negative interpretation of forest conversion remains due to historical mismanagement of ruminants in forests, and it can be harder to get support or funding.
- Some animal species are not appropriate to all forest landscapes. Some browsing sheep and goat species can damage established forests.
- Animal rotations must be managed much more strictly if existing trees can be assured survivability.
- New tree plantings and any understory plants that are desirable to be retained should be protected by strong fencing infrastructure.
- If any bodies of water exist in the forest, they will need to be protected from animal fecal matter that may impact watershed.
- Erosion control measures must be taken if the existing forest is sloped. An increase in tree plantings and the associated maintenance measures must be planned for.

Planting Into Pasture

- New tree plantings and any understory plants that are desirable to be retained should be protected by strong fencing infrastructure.
- New tree species should be selected based on soil conditions and market forces (stock cost and product sale considerations).
- Pick species that will work with the existing pasture, in terms of shading and ground management, allowing for healthy pasture to continue as the trees mature.
- Make sure that existing pastureland has been evaluated for any endangered or threatened plant (grasses, etc) or animal (bird, etc) species so that you are not displacing critical instances of biodiversity by converting pasture to forestland/orchard.
- Some residents may have tree nut allergies so being aware of the needs of residents and neighbors if doing large-scale plantings of a singular type of tree will be necessary.

INVASIVES MANAGEMENT AS A TRANSITIONAL STEP

- Animal species such as sheep and goats are important ecosystem partners in the management of invasive plant species in forests.
- Invasive shrubby species can be useful sources of nutrition during the multi year transition.
- Make sure you are planning strategically if you plan to plant potentially invasive tree species into pasture as part of your pasture-to-silvopasture conversion plan. Make sure you know the toxicity concerns of any species, and for potentially invasive species, know the state status (ie., is it banned) and its reproductive cycle.

POTENTIAL CHALLENGES SPECIFIC TO EMS

- When competent assistance is available, it is typically limited to conventional agriculture and forestry due to the gaps in specialized knowledge of Technical Service Providers (TSPs). When technical support is available, it often goes first to larger farms.
- Specifically for existing forest lands it can be very difficult to get a forester to even do the work as it can be economically unattractive to them if the timber harvest is poor.
- To attain expert advice on planting into pasture or forest conversion, EMs may need to travel long distances, halt their projects in search of expert advice, or figure it out as they go. This sometimes makes for costly errors. For more information on racial justice in agroforestry, see Reference #3.

Forage Species

Silvopasture landscapes should feature a diverse variety of plantings for forage purposes. Animals should have free access to forage during leafing seasons. See recommended plant lists specific to your region and aim to be more expansive in the number of native species as much as possible.

Look for a mix suitable for the level of grazing intensity appropriate to your species and rotational schedule. Include species that can contribute to soil health. Native grasses do exist but may not offer as much forage value. Do your research on appropriate plant species for carbon sequestration, forage value, and native establishment.

Some species may be incorporated in edge and border areas rather than across the entire planting landscape. Fodder is food that the owner produces for the livestock by making it accessible. A border planted with willows can be coppiced and thrown over the fence line, providing medicine and nutrients to the ruminants. These willows can be considered fodder species, as the animals don't actually graze the plants.

Diversify plant species for optimal pest insect control and optimal bird and animal ecology support.

ANNUALS: Broad-leaf herbaceous plants, grasses. Ryegrass, wheat, oats, cowpea, soybean, and crimson clover. Also radishes, turnips, other annual brassicas, sorghum-sudangrass

PERENNIALS: Bahiagrass, bermudagrass, dallisgrass, johnsongrass, switchgrass, white clover, and others. In some areas, most pasture comprises orchardgrass and timothy. Birdsfoot trefoil can be an excellent addition. White and red clover and alfalfa can all be valuable components. For further information, see Resource #4.

CONSIDERATIONS/SELECTION ADVICE

Be suitable for livestock grazing and be able to meet the nutritional needs of the chosen livestock. Be compatible with the site. Be productive under partial shade. It is important to choose forage that will do well in the level of shade produced by the tree cover. For additional information, see Reference #4.

POTENTIAL CHALLENGES SPECIFIC TO EMS

Hauling forage plants and implements from nurseries is a regular occurrence. Having access to transportation (pickup truck, trailer, etc) is a necessity.

Tree Species

Silvopasture landscapes should feature a diverse variety of tree plantings. See recommended tree lists specific to your region and aim to be more expansive in the number of native species as much as possible.

Willow, Black Locust, Mulberry, Poplar, Honey Locust– See References #3 and #6 for more info.

CONSIDERATIONS/SELECTION ADVICE

Depends on management objectives, site conditions, whether converting pasture or forest to silvopasture, and desired products.

PASTURE TO SILVOPASTURE: plant trees (timber, fruit and nut-producing trees, or fodder trees) and provide tree protection.

TIMBER STAND/WOODLOT TO SILVOPASTURE: thin and/or prune trees to increase ground exposure to light and establish forage that tolerates shading. See Reference #6 for further information.

POTENTIAL CHALLENGES SPECIFIC TO EMs

Hauling trees, plants, and implements from nurseries is a regular occurrence. Having access to transportation (pickup truck, trailer, etc) is a necessity.

Markets for Products

MARKETS

Farmers Markets, Etsy, Holiday Markets, State and local fairs and exhibitions, restaurants, grocers, bodegas, gift basket partnerships, State and local Tourism sites (Taste NY Market locations, Chambers of Commerce events and outlets, etc) (Reference #7).

Farm stands can be useful for income, are more passive.

- Creating a diverse array of market outlets is important for a successful silvopasture/forest-based product business.
- The crafts network of artists that work with woody cuts and weaving can be a potential market.
- Hosting educational events and classes can also generate income and grow networks.

POTENTIAL CHALLENGES SPECIFIC TO EMS

- Having access to adequate transportation to bring products to market is a necessity.
- Farm stands can be a site of conflict for EMs if experiencing discrimination.

LEARNING FARM

The Learning Farm Grazing and Tree Planting Layout

REPORT FROM 2022

The Learning Farm is a Tompkins County-based family farm run by Pete and Christa Nuñez (khubainternational@gmail.com).

In March 2022, Cornell Cooperative Extension of Tompkins County's Agroforestry Educator visited the site and consulted with Christa about siting a 1 acre small-ruminant (primarily goat) silvopasture demonstration plot at the Learning Farm and worked with her to help design the layout and species included.

The area was heavy overgrown with honeysuckle and other invasive plant species. Over the course of the 2022 growing season, The Learning Farm staff cut down much of this brush and began using goats to eat-back the regrowth and cycle nutrients in the soil.

By September 2022, oaks trees were planted adjacent to the silvopasture site as the goats were finishing up their year's browsing on the invasive's regrowth.

Christa has identified a diversity of species to utilize, including: apples, pears, pawpaws, chestnuts, and hazelnuts.

The Agroforestry Educator at CCE continued communicating with Christa to support her in fine-tuning silvopasture layout and logistics of running animals through the site, while protecting future trees. Direct assistance with sourcing plant material was also useful.

UPDATE JULY 2023

A new site plan was drafted focusing on using hazelnuts in combination with fruit trees and the existing berry plants. Chestnuts will be planted minimally as the mature spacing does not match the size of the space, whereas hazelnuts can be planted as hedgerows along the fence and proposed agritourism yurts, maximizing planting space.

A grazing plan was also being developed to ensure the health and safety of the new plantings.

Christa and the Agroforestry Educator discussed connecting with the Agroforestry Resource Center to help with forest farming, specifically elderberry and mushroom farming. The lower creek area of the Learning Farm site has access to water and a strong potential for serving as a demonstration of forest farming. There is no deer fencing which needs to be addressed if anything besides elderberry and mushrooms are to be pursued.

PLANT SPECIES LIST

GRAZING SPECIES	TREE SPECIES	OPTIONAL
Clovers	Hybrid Hazelnut (harvest)	Elderberry (human harvest)
Trefoil	Honey Locust (mast)	Willow (tree fodder)
Cool season and warm season grasses	Hybrid Chestnut (if space) (harvest)	Poplar (tree fodder)
Consider brassicas on rotation for human crop and then supplemental feed	Persimmon (Diospyros virginiana)(harvest)	Mulberry (poultry feed and human harvest, trimmings can be fodder)
	Black locust (utility, timber, fodder)	Hardy Pecan
	gingko	

Number and species of trees planted (at demo site)
5-7 acres, 8 different species, new planting to include 5 different tree species

LIVESTOCK

SPECIES	AUE (animal unit equivalent) per individual	DM (dry material) demand/day in lbs total
Alpaca x 3	.3	25.2
Chicken x 32	.11	98.46
Rabbits x 6 (angora)	.11	18.48
Goat (dry) x 11 (anglo-nubian)	.17	44
Duck x 17	.11	52.36
Geese x 2	.12	6.2
Sheep (dry) x 3 (2 katadhyn, 1 icelandic)	.2	15
Guinea Hen x 2	.11	6.16
TOTAL		265.86lbs/day
6 acres	15-35lbs/day of forage production/acre	90-210 available

Numbers and species of livestock incorporated, stocking rate (at demo site)
11 goats (10 nubian, 1 dwarf), 3 sheep (icelandic, 2 katadyn), 3 Alpaca, 2 guinea hens, 32 chickens, 17 ducks, 2 geese, 6 rabbits (angora)

REFERENCES

1. Jonathan Bates (Agroforestry Educator) and Graham Savio (Agriculture & Horticulture Issue Leader), Cornell Cooperative Extension Tompkins County https://ccetompkins.org/agriculture/agroforestry
2. https://smallfarms.cornell.edu/2018/06/six-key-principles-for-a-successful-silvopasture/
3. https://ext.vt.edu/content/dam/ext_vt_edu/topics/agriculture/silvopasture/files/trees-in-silvopasture.pdf
4. https://static1.squarespace.com/static/5fe0e18f097b5a752bcc1c0d/t/64bea5ea3617be5837352bfc/1690215917292/Up+From+The+Roots_final.pdf (from https://www.interlacecommons.org/research)
5. https://www.uwsp.edu/wp-content/uploads/2023/06/UM-Extension-Silvopasture-Manual-Episode-4.pdf
6. https://projects.sare.org/information-product/silvopasture-tree-species-profiles/
7. https://projects.sare.org/wp-content/uploads/Silvopasture-Understanding_Agroforestry.pdf
8. https://forms.office.com/Pages/ResponsePageaspx?id=6rhs9AB5EE2M64Dowcge59KKAFUGQUdJt7BaZCuU7phUOVczOEM3NDdFVzU1Q1VKRzBKMDFQOU1OMS4u

ADDITIONAL RESOURCES

- https://projects.sare.org/wp-content/uploads/Silvopasture-Understanding_Agroforestry.pdf
- https://onpasture.com/2020/10/26/if-its-so-great-why-dont-we-see-silvopasture-everywhere/
- https://treesforgraziers.com/product/the-graziers-guide-to-trees/
- https://forages.org/
- https://www.asdevelop.org/wp-content/uploads/2021/05/Silvopasturing3-3-2011.pdf
- https://centerforagroforestry.org/wp-content/uploads/2022/12/Chapter-4-Silvopasture.pdf
- https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/d/5957/files/2015/03/SP-Creating-Quality-Silvopastures-conf-version-2jcp5lh.pdf
- https://projects.sare.org/sare_project/ene23-187/
- https://projects.sare.org/project-reports/fne19-930/

FUNDING RESOURCES

- **Virginia Tech** (private funding) https://www.catalyzingagroforestry.org/cagp
- **Propagate and The Nature Conservacy** (USDA Funding) https://www.propagateag.com/csc#:~:text=The%20U.S.%20Department%20of%2Agriculture,reducing%20dependence%20on%20external%20inputs.
- **Pasa** (USDA Funding) https://climatesmart.org/
- **SWCD** – farmers should talk to their local office about the Climate Resilient Farming program. $29 million available in this year's round with about $1 million earmarked for agroforestry systems. https://agriculture.ny.gov/soil-and-water/climate-resilient-farming
- **NRCS** – farmers should talk to their local office about the Conservation Stewardship Program and Environmental Quality Incentive Program, both of which can fund tree planting. $3.1 billion in additional funding available (nationwide over 5 years) through IRA, beyond the standard funding. https://www.nrcs.usda.gov/programs-initiatives/csp-conservation-stewardship-program/new-york/conservation-stewardship-program

  https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives/new-york/eqip
- **Wolfsneck** – This program is supporting regenerative agriculture like maintaining living soils year-round through the Partnerships for Climate Smart Commodities. Although they aren't explicitly supporting Agroforestry with this program there are other agroforestry relevant practices like prescribed grazing, mulching and carbon amendments like compost and biochar https://www.wolfesneck.org/partnerships-for-climate-smart-commodities/
- **Establishing Large Forests Grant Program** (5 acres or more) https://dec.ny.gov/nature/forests-trees/private-forest-management/establishing-large-forests-grant-program

A list of agroforestry funding resources can be found on the Khuba International website: khubaintl.org

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