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Silvopasture Water and Fencing Systems for Cattle

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Introduction

Silvopasture is an agroforestry system that combines grazing livestock with growing trees for a timber product. Creating small, fenced paddocks and rotating cattle builds in "recovery periods" for the forage and protects the soil and trees. In a silvopastoral system, grazing recovery periods can only be achieved when well-designed livestock water supplies and cross fences are used.

High tensile wire fence and portable water tanks are economical tools for improving silvopasture utilization.

Fortunately, technological advances in livestock water system design and fence materials have helped to create a feasible working environment where rotating livestock from one silvopasture paddock to another can be both convenient and affordable. However, some special considerations must be given to water and fencing in a silvopasture system.

Water

Animals acquire water through drinking and from the moisture in the forage they eat. As air temperature increases water requirements also increase. This becomes especially critical as air temperatures exceed 77° F. The need for available drinking water is compounded because forages become drier at higher temperatures. At 90° F, a 600 pound growing steer needs about 13 gallons of water per day. At 60° F, that need falls to eight gallons per day. One distinct advantage of a silvopasture system is that shade is distributed throughout the pasture and greatly reduces high temperature stress on livestock.

Water Requirements

Water requirements vary for the kind, size, age, and breed of livestock. For example, *Bos taurus* breeds of cattle (European types) generally consume more water than *Bos indicus* breeds (such as Brahman-influenced breeds). Dairy breeds need significantly more water than beef breeds. The rule-of-thumb used by some livestock managers is one gallon of water per day per 100 pounds of body weight per animal. *Table 1* further illustrates the wide range of water intake needed by different types of livestock. Water use also varies considerably depending upon the animal's health, air temperature, water temperature, stage of lactation, and other environmental factors.

Table 1
Water Intake

	Daily needs in gallons per head	
	50° F	90° F
Beef animals		
400 lb. calf	4	10
800 lb. feeder	7	15
1000 lb. feeder	8	17
Cows and bulls	8	20
Dairy animals		
Cows	15	30
Calves	2	12
Replacement heifers	6	15
Bulls	8	20
Horses and mules	8	12
Sheep or goats	1.5	3.5

Source: D.M. Ball, C.S. Hoveland, and G.D. Lacefield. 2000. Southern Forages and the Foundation for Agronomic Research. Norcross, Georgia.

Special Water Considerations for Silvopasture

- Consider using portable water tanks.
- If installing permanent tanks, consider concrete tanks.
- Consider using tank covers on permanent tanks.
- Consider installing water within 600 feet travel distance.

Water Distribution

Daily intake of water increases when travel distance is less than 600 feet. Water consumption may be 15 percent higher in small paddocks with water in every field (less than 600 feet of travel) than in similar systems with water available at a single source (where cattle may travel between 600 and 2000 feet to water). When forage resources are located long distances from the associated water supply, cattle tend to move back and forth to the water as a herd. This not only limits the number of times per day that animals can water, but it will likely limit the total consumption of both water and forage. When water is located close to the forage resource, the herd's "social structure" is modified such that animals tend to water more frequently as individuals. This tends to keep the herd dispersed throughout the paddock and results in a greater portion of time spent grazing. *Table 2* shows the relationship between livestock water consumption and feed intake.

Table 2
Livestock Water and Forage Intake Relationship

Optimal water intake	⇆	Optimal forage intake
20% reduction	→	4.5% reduction
40% reduction	→	22% reduction

Traveling long distances to water tends to promote overgrazing in areas closest to water and underutilization of forages located at greater distances. Overgrazing causes excessive compaction of the soil and has negative impacts on forage and tree production in a silvopasture system. Thus the ideal water system should provide fresh drinking water in each pasture with a maximum of 600 feet travel distance from any location in the pasture. Of course, it is not always possible to install the "ideal" water system and many successful grazers utilize water in pastures larger than 32 acres with travel distances to water greater than 600 feet. Dedicated travel lanes have been successful to allow cattle to travel to central water locations. This approach, however, is best suited to level terrain and locations with only slight erosion hazards. To compensate for less than ideal situations special care must be taken to monitor grazing impacts on trees and forages. Adjusting the stocking levels and grazing rotation periods can help protect both the forage and the trees in a silvopasture system with water distribution problems.

Water supply options for silvopasture include wells, creeks, ponds, spring developments and even municipal or rural water systems. Ponds can provide a good reliable source of drinking water for livestock and wildlife, as well as providing other benefits. The pond's watershed should be protected from erosion and excess agricultural chemical or nutrient runoff so it can provide good clean water. This is not a problem in a well-managed silvopasture system. In many situations it is advisable to utilize a pipeline and tank in conjunction with the pond in order to have optimum water quality for the livestock, wildlife and recreational uses. Hydraulic rams, solar pumps, sling pumps and pasture pumps are mechanical devises that aid in the distribution of water and may have application in certain situations.

Water Tanks
Consider utilizing portable livestock tanks that can be removed during tree management or harvesting operations. These portable tanks can also be easily cleaned of debris. If permanent tanks are desired, consider installing concrete tanks with covers to keep debris out of the water. These tanks are also more resistant to damage from falling branches during pruning and harvest operations.

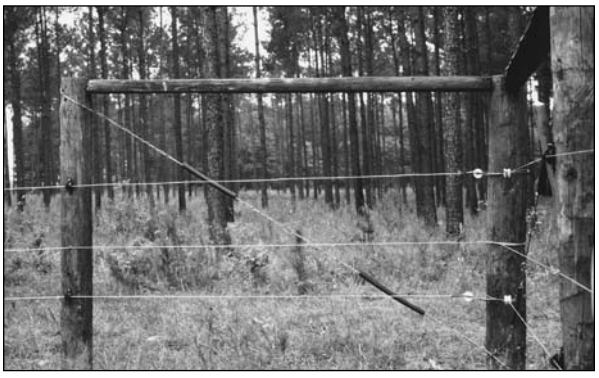
A pipeline system for pumping water from a pond into a watering tank can minimize livestock activity in ponds and streams helping to protect water quality for livestock and wildlife. Portable tanks are also easily removed during timber harvesting.

Fencing

Proper pasture rotation provides "recovery periods" for the grazed forage, minimizes soil compaction, and protects trees in a silvopasture system. There are several key components in an effective and easily-managed fencing system:

- An energized fence is primarily a psychological barrier and can only be effective if the fence carries enough current to deliver a "deterrent" shock. Alternating current (AC) powered units are generally the best choice for energizing a fence if 220- or 110-volt power is available. For remote areas, battery powered systems with solar recharge may be necessary. In a silvopasture system, the potential for malfunction increases with the risk of falling branches or trees damaging the system. To assure effective operation, the energized fence should:
  - Have a proper-sized energizer. Generally one-joule output per mile of fence is sufficient.
  - Be properly grounded with a minimum of three feet of ground rod per joule output (typically provided by three, 96-inch ground rods, or other configurations in shallow soils, spaced at least 10 feet apart).
  - Be protected from lightning by installing a surge protector at the power source, a lightning choke at the fence, and an additional ground rod every 3,000 feet of fence.

- High tensile wire is recommended when using energized fences for border areas and is also used for cross fencing. The number of strands depends upon the type of livestock being grazed. Generally, a minimum of four- to six-strands is recommended for border fencing and one to three strands for cross fencing cattle. Other types of livestock often require special considerations such as distance above the ground of the bottom wire, and distance between wires for smaller livestock like goats and sheep.



Energized high tensile wire fence will withstand falling debris. Strategically locate power switches to improve pasture access and diagnosing power failures.

- Polywire or polytape can be used for temporary or portable cross fencing to create smaller paddocks for intensive grazing or to allocate stockpiled pastures for winter grazing. This enhances the manager's ability to provide optimum, forage recovery periods.

- Refer to NRCS specifications, Extension publications or guides published by reputable fencing companies for requirements to meet local environmental conditions and special livestock considerations.

Properly located water sources, even shade distribution, and well-proportioned grazing paddocks improve grazing and water intake efficiency.

Tools

A few simple tools are useful when using energized fencing as part of the grazing system:

- "Spinner" – Before installing high tensile wire, acquire a "spinner" to reel out the wire without adding twists.
- In-line switch – A wise investment: by strategically locating switches, a landowner can save miles of walking when tracing electrical current using a voltmeter.

Rest and Rotation

To maintain healthy, vigorous, high-quality forage plants, a rest or recovery period is essential. Without recovery periods, choice forage plants will be repeatedly overgrazed, which results in weak plants unable to replenish their root system and adequately produce regrowth. Overgrazing also increases the potential for soil compaction, which decreases water infiltration, and aeration of the soil. These effects decrease the health and vigor of the trees being grown in the silvopasture for timber products. Adequate fence and water systems facilitate the rotational grazing of livestock through a series of pastures essential for the successful management of the forages as well as the trees in a silvopasture system.

Summary

Availability of dependable, quality drinking water can be a significant factor in a successful grazing management system using silvopastures. Remember, the underlying purpose for a fence is to allow for "recovery period" for the forage and the protection of the soil and trees.

Additional Information

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