

SILVOPASTURE



OVERVIEW OF A HIGH-IMPACT DRAWDOWN SOLUTION

Silvopasture is the practice of adding trees to pastureland. Silvopastures can sequester carbon in the trees and soil and help counteract the methane emissions associated with raising cattle on pasture lands.

TECHNOLOGY AND MARKET READINESS

Silvopasture is an ancient practice, integrating trees and pasture into a single system for raising livestock. It can help sequester carbon, reduce soil erosion, improve water quality by shading streams (Franzluebbers et al., 2000) and provide shade for livestock which improves animal health and productivity (Swift and Messers 1971, Clinton 2011, Baas et al. 2017, NRDC 2017, USDA n.d.). Shade-tolerant and semi-tolerant crops such as blueberries and blackberries can also be incorporated into Silvopastures. In combination with the “Afforestation” solution, Silvopasture is a technological and market ready solution.

LOCAL EXPERIENCE AND DATA AVAILABILITY

Georgia has limited experience and operational data at large scale to assess its potential. However, the state of Georgia has about 2.8 million acres of pastureland, which could be converted into silvopasture practices (USDA 2016, USDA-NASS). (Also, see “Afforestation.”)

TECHNICALLY ACHIEVABLE POTENTIAL FOR INCREASED CO₂ SEQUESTRATION

The solution has the potential to sequester more carbon in the soil (Morgan et al. 2010). According to the USDS (2016) 7.3% of the state of Georgia was in pastures in 2012 for a total of about 2.8 million acres.

Conservatively, we consider the option of planting trees in 10% of Georgia’s current pastures. Two approaches are considered: (1) planting with mixed tree species (which is preferable for biodiversity and wildlife, but sequesters a bit less CO₂) and (2) planting entirely as loblolly pine (*Pinus taeda*) (which sequesters more CO₂ but could cost more if actively planted and managed, and is not as beneficial for biodiversity).

For each scenario the estimated CO₂ sequestration refers to CO₂ stored in both trees and in soils. The mixed tree species scenario at a 10% crop+pasture planting level would annually sequester 5.3 Mt CO₂ in 2030. The Loblolly Pine scenario with a 10% crop+pasture planting level would annually sequester 7.8 Mt CO₂ in 2030. Also see the discussion of “Afforestation” which overlaps with this solution’s estimated carbon sequestration.

COST COMPETITIVENESS

Cost depends on the adoption rate of farmers in Georgia and the potential incentives provided to the farmers. Economic analysis suggests that silvopasture systems are more profitable over time than monoculture system (Stainback and Alavalapati, 2004). Also see “Afforestation.”

BEYOND CARBON ATTRIBUTES

Reforestation formerly forested lands would provide biodiversity conservation, jobs, and freshwater quality benefits.

Environmental benefits of afforestation include improved air quality through a reduction in particulate matter (Nowak, 2002). Afforestation provides habitats for wildlife further benefiting local ecosystems and may provide social-economic opportunities through timber production, and recreation, and tourism. Since these solutions are often concentrated in rural areas, the environmental and social benefits are often accessible to lower income groups, providing increased mental/physical health from outdoor recreational opportunities (Karjalainen, et al., 2009).

The rural land use available for farming may be reduced, but may be supplemented by farming tree products, which can lead to economic benefits for landowners, increasing sustainable income (Hardy, et al., 2018).

Afforestation also has the potential to cut farmer's costs by reducing the need for feed, fertilizer and herbicides, and can improve the fertility of soil with clay content. However, costs to establish and maintain the solution, for example increased water usage to plant trees, pruning, and root damage to infrastructure, should be considered. Additionally, trees can be a source of seasonal pollen allergies.

Afforestation is positively linked to infant health; increasing fresh plant-based food supply in food deserts lowers prematurity and low birth weight rates in these areas (Zhang, et al., 2018).

Economic barriers to implement and maintain afforestation may be an issue for low-income farmers (Current, et al., 1995). Shifting traditional farming routines is a potential issue for new solutions that are not typically custom for farmers, and therefore may not be easily adopted (Calle, et al. 2009). See also "Silvopasture."

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Endnotes:

1. Silvopasture studies in the U.S. <https://www.fs.usda.gov/nac/practices/silvopasture.php>
2. <https://www.drawdown.org/solutions/food/silvopasture>
3. USDA, n.d. Silvopasture studies in the U.S. <https://www.fs.usda.gov/nac/practices/silvopasture.php>

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