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REVIEW ARTICLE

A REVIEW ON SILVIPASTURE SYSTEMS RELATION WITH DIFFERENT ASPECTS

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ABSTRACT

Silvopasture systems, integrating trees, forages, and livestock, are recognized for their potential to enhance land productivity and ecological resilience. This paper synthesizes current research on silvopastures, emphasizing their role in mitigating climate change impacts while optimizing agricultural productivity. Key topics explored include soil nutrient dynamics, forage quality improvement, high-density system optimization, and ecological benefits. Silvopastures offer promising solutions, such as carbon sequestration, enhanced livestock nutrition, and efficient land use. As a sustainable land management approach, silvopastures provide a multifunctional blueprint for addressing environmental challenges and fostering resilient agricultural systems in a changing world.

KEYWORDS

Silvipasture, livestock, diversity, nutrients

1. INTRODUCTION

Silvopasture systems represent a dynamic fusion of trees, forages, and livestock, meticulously orchestrated to optimize land productivity and ecological resilience. Embraced as a cornerstone of sustainable land management, silvopastures offer a multifaceted toolkit for enhancing ecosystem services within a versatile working landscape (Jose, 2009; Peters et al., 2013). By seamlessly integrating ecological functions with productive agricultural activities, silvopasture systems hold immense promise in confronting the challenges posed by climate change (Lawson et al., 2018; Rosenstock et al., 2019). However, the realization of their full potential hinges upon the intricate interplay among their constituent elements within specific environmental contexts.

2. SOIL NUTRIENT VARIATIONS IN SILVOPASTURE SYSTEMS

A nuanced comprehension of soil nutrient dynamics in silvopasture ecosystems is paramount for informed management decisions aimed at maximizing biomass yield while minimizing environmental footprints (Shrestha and Alavalapati, 2004). By delving into factors such as ecological nuances and land-use practices, researchers have uncovered the pivotal role of soil carbon distribution in shaping carbon sequestration potential within distinct soil aggregate classes (Howlett et al., 2011). Notably, silvopasture configurations featuring cork oak trees have emerged as stalwart guardians of soil carbon, outperforming native pastures in carbon storage and thereby offering a potent mechanism for climate change mitigation (Kim et al., 2016; Verchot et al., 2007).

3. ENHANCED FORAGE NUTRITIVE VALUE IN SILVOPASTURE

Silvopastures hold the promise of elevating forage quality, thereby augmenting livestock nutrition and performance. This augmentation stems from a myriad of influences, including morphological adaptations induced by tree presence and alterations in botanical composition driven by microenvironmental nuances (Eriksen and Whitney, 1981; Brooks, 1951; Sharrow, 1999). By providing shelter and modulating microclimatic conditions, trees within silvopastures confer a dual benefit of enhancing forage digestibility and ameliorating thermal stress on livestock, thereby bolstering animal welfare and productivity (Klopfenstein et al., 2006).

4. OPTIMIZING FORAGE PRODUCTION IN HIGH-DENSITY SILVOPASTURE SYSTEMS

High-density silvopasture systems, characterized by dense plantings of trees and shrubs alongside high-yielding grasses, epitomize a paradigm shift in forage production efficiency (Murgueitio et al., 2011). These systems, marked by their ability to harness limited land resources for high-quality forage production, offer a compelling alternative to traditional pasture management approaches (Payne, 1985). Furthermore, by leveraging the competitive advantage of high tree densities, silvopastures emerge as frontrunners in optimizing forage yields while simultaneously enhancing environmental sustainability (Orefice et al., 2016).

5. ECOLOGICAL CONSIDERATIONS FOR SUSTAINABLE SILVOPASTURE MANAGEMENT

Silvopastoral systems embody a harmonious integration of livestock, trees, and forages, yielding a panoply of ecological benefits ranging from enhanced wildlife habitat to soil conservation (Giraldo et al., 2011). Beyond their environmental prowess, silvopastures offer an aesthetically pleasing landscape reminiscent of natural woodlands, thereby circumventing the environmental concerns associated with concentrated livestock operations (Klopfenstein et al., 2006). Moreover, silvopastures serve as bulwarks against climate change-induced disruptions, offering a multifunctional blueprint for sustainable land management in an era of environmental uncertainty.

6. CONCLUSION

Silvopasture emerges as a beacon of hope in the realm of agroforestry, embodying the ethos of sustainable land management through its synergistic integration of trees, forages, and livestock. By capitalizing on biological interactions among its components, silvopasture systems offer a potent arsenal for combatting climate change while fostering resilient livestock production systems. As we navigate the complexities of a

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changing world, embracing silvopastoral practices promises to unlock a sustainable path forward, where ecological integrity converges harmoniously with agricultural productivity.

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