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CARRYING CAPACITY OF AGRO-FORESTRY SYSTEM FOR SUSTAINABLE SMALL RUMINANT PRODUCTION

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Abstract: A study was conducted to assess the carrying capacity of Silvipasture in the dry land tract of Tamil Nadu for small ruminant production. One acre of land was earmarked for establishment of the silvipasture. *Gliricdia* sps. and *Leucaena leucocephala* were selected for tree component and the understorey, was utilized to establish pasture with *Cenchrus ciliaris, Stylo hamata* and *Stylo scabra*as as grass with seed ratio of 3:1:1. The biomass yield was recorded for three years at an interval of two months. The total biomass yield from the tree component, grass and legume component were 35-37 MT per annum. The biomass yield of the tree component, *Gliricidia sps* was higher than *Leucaena leucocephala*. The biomass yield from the grass and leguminous component by cut and carry system was able to supply fodder to meet nutrient requirements (BIS) of sheep and goat. It was concluded that as per the requirements for sheep and goats, by establishing this type of Silvipasture, the famers could maintain around 16-18 sheep or 12-14 goats in an economic way to enhance the revenue from the unit of land.

Keywords: Carrying Capacity - SilviPasture System - Small Ruminant Production

Introduction

Silvipastoral systems/models by introducing trees/shrubs into natural pasturelands/waste lands could be developed to provide nutritious green foliage throughout the year (Singh, 1995). Silvopasture, an agroforestry system that combines trees and livestock with forage to form a carefully designed system, has gained popularity in recent years as an environmentally friendly alternative land use system that is economically viable (Jose et al. 2019). Similarly, horticulture and small ruminant (sheep and goat) production systems play a vital role in sustenance of livelihoods of rural poor of rainfed agro-ecosystem (Pasha 2000) in arid and semi-arid regions, where crop production is a risk-prone enterprise due to uncertain rainfall and frequent droughts. Farmers willing to establish small ruminant enterprises along with agricultural activities especially cropping on a gross margin per unit of land basis must estimate the carrying capacity of the particular system and calculate per unit returns of money for sustainable and successful enterprise. Animal forestry is an essential and emerging

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venture having great potential for not only providing feed for livestock and also an environmentally safe system for land use.

Materials and Methods

To assess the carrying capacity of the dry land for small ruminant production a trial was conducted to establishing Silvipasture in a dry land tract. The area selected for the trial had an average annual rain fall of 650-750 mm and temperature ranged between 28^0 -45^0C.One acre of land was earmarked for the trial and the land was prepared to establish silvipasture. *Gliricdia* sps.and *Leucaena leucocephala* seedlings were selected for tree component and planted in the space 3X3 m. The understorey, the land between the trees was utilized to establish pasture with *Cenchrus ciliaris* as grass component as source of energy and *Stylo hamata* and *Stylo scabra*as leguminous fodder crop as a source for protein with seed ratio of 3:1:1. Rain gun facilities were established for periodical irrigation. The biomass yield wasrecorded for three years at an interval of two months. After every harvest the fodder, top dressing was done by farm yard manure.

Results and Discussion

The total biomass yield from the tree component, grass and legume component were 35-37 MT per annum. The biomass yield of the tree component, *Gliricidia sps.* was higher than *Leucaena leucocephala*. The biomass yield from the grass and leguminous component by cut and carry system was able to supply fodder tomeet nutrient requirements of sheep and goat. Feeding grass and tree leaves each at 50% level was found economically superior than feeding grass and concentrate mixture in lambs (Parthasarathy, *et.al*, 1998). As per the BIS requirements for sheep and goats, by establishing this type of Silvipasture, the famers could maintain around 16-18 sheep or 12-14 goats in an economic way to enhance the revenue from the unit of land. Silvopasture, as an integrated land use practice, has been proven to be economically and environmentally sustainable both at small and large scales. Simelton and Hoang, (2011) also stated that Agro-forestry diversifies the environmental and economic functions of small scale farming system and is therefore considered more resilient than monocropping to external stress.

Conclusion

The results of the trial ascertained the possibilities of establishment of silvi-pasture by cut and carry system to cater the nutrient requirement of the sheep and goat to make this as a successful enterprise for improving the social-economic status of the farming community.

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