

A novel silvi-pastoral model to conserve natural resources in semi-arid regions

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ABSTRACT

The semi-arid environment is characterized by hostile environmental conditions like high atmospheric water demand, high mean annual temperature and least variable annual rainfall. The precipitation exceeds potential evapotranspiration for 2–5 months in these areas. The dryland agriculture is the predominant land use system in the tract. These ecosystems have become fragile because of low and erratic rainfall, improper soil and water conservation practices and lack of perennial vegetation. The practice of agriculture in such fragile ecosystems is causing faster degradation of land resulting in loss of fertility and productivity. The arable crops grown in these areas cover the land generally for one season of about 3–4 months. Therefore, the rainfall received during uncropped season goes unutilized because of any perennial vegetation. The tree species in general are known to be more tolerant to adverse soil and climatic conditions than most of the arable crops. They can utilize the off seasonal rainfall and provide multiple benefits. In recent decades, drought and famines have underlined the need for the adoption of sustainable land use systems like silvi-pastoral system, capable of responding flexibly to rapid shifts in economic and ecological conditions. In the dryland ecosystems the practice of agriculture is not yielding regular returns due to low and erratic rainfall. Hence, practice of silvi-pastoral system in dryland ecosystems will be helpful to improve the overall productivity and sustain it as well. In this context, pongamia based silvi-pastoral model encompassing goat farming, vermiculture and apiculture could be an appropriate farming system for the semi-arid regions. This system also encourages other farming activities to conserve natural resources and to improve the economic status of farmers of the semi-arid regions.

KEY WORDS : Apiculture, Goat farming, Pongamia, Silvi-pastoral, Vermiculture

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INTRODUCTION

The increasing area under marginal and sub-marginal wastelands, deterioration of forest land and increasing social needs of forage and firewood call for an early action to vegetate these lands with fast growing multipurpose trees, grasses and legumes under a kind of integrated management system. This system involving trees or woody perennials with grasses and legumes utilized by harvesting or grazing with an inbuilt component, which is known as silvi-pasture.

Pongamia is botanically called as *Pongamia pinnata*, is a fast growing tree reaches 40 ft in height and forming a broad spreading casting moderate shade. It can be grown in any type of well drained soil *i.e.* clay loam to sandy loam even slightly alkaline to acidic condition, it is highly

drought tolerant tree and moderate in its salt tolerance. It is one of the nitrogen fixing tree and is often planted as ornamental and shade tree. Looking to its ability to produce multiple products, would be a better candidate, both in arable and non-arable lands. In recent days, particularly the increase in demand for bio-fuel has necessitated the adoption of tree based oilseed (TBOs) land use system involving pongamia, jatropha, neem, mahua, etc. *Pongamia pinnata* is an indigenous bio-fuel plant with 35–40% oil content. It can be grown well under variety of situations and it is more suitable for semi-arid regions where the rainfall is 500–750 mm. The trees start yielding the pods at the age of 5–6 years due to the long gestation period, farmers may not appreciate monoculture of pongamia. Therefore, the inter-space available in the plantation could be used for growing under storey forage components like grasses and legumes. The forage so produced could be used for stall feeding of goats. This sub-system will start production from first year itself. Further, the fecal matter of goat produced and the non forage green biomass available can be used to produce vermicompost simultaneously along with goat farming. When the plantation reaches an age of 5–6 years, the flowering starts during the months of March to May, at this stage apiculture can be introduced.

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