

Traditionally Important Trees In Indigenous Agroforestry Systems in Tamil Nadu

*Merwin Deepak T

B.Sc. (Hons.) Agri Student, Palar Agricultural College, Melpatti, Vellore, India

*Corresponding Author's email: merwin1603@gmail.com

Ecological & Environmental Insights

Multipurpose native trees and fast-growing species—such as *Ailanthus excelsa*, teak, neem, tamarind, Gmelina, bamboo, Casuarina, and eucalyptus—are widely used in traditional agrisilvic systems. These support soil stabilization, organic matter buildup, and overall farm productivity across Tamil Nadu's seven agro-climatic zones .



- **Water regulation & microclimate management:** Deep-rooting species like neem, *Aegle marmelos* (vilvam), mango, jackfruit, and *Ficus* spp. recharge groundwater, retain moisture, and create moderated microclimates—vital for dryland farming and drought resilience.
- **Carbon sequestration potential:** Indian agroforestry models are increasingly recognized for their capacity to sequester carbon in both biomass and soil. Tree biomass accumulation in well-managed agroforestry systems offers a significant sink for greenhouse gases, though Tamil Nadu-specific sequestration data remains limited; national findings underscore the high potential under correct tree-crop arrangements .

Livelihood, Productivity & Economics

- **Model types & income enhancement:** Traditional systems like silvihorti (fruit+horticulture), silvipasture (fodder trees+grasses), and agrisilviculture (timber/fuel trees + annual crops) are widespread. For instance, combining *Acacia leucophloea* with *Cenchrus ciliaris* (fodder grass) supports livestock feed and helps restore degraded lands in Coimbatore and Erode districts (over 120,000 ha) .
- **Industrial-scale agroforestry:** Tamil Nadu's industrial agroforestry "value-chain model" launched in 2005 has driven over 80,000 ha of plantation by 2022, achieving an annual productivity of ~25 m³ biomass per hectare and benefit-cost ratios exceeding 3:1. Contract farming and assured markets via consortiums (e.g. CIAF) have offered income predictability and encouraged adoption among farmers .
- **Crop productivity under trees:** Trials with *Ailanthus excelsa*-based silvihorticulture show that leafy vegetable crops and pulses can be grown beneath tree canopies with minimal yield loss—and sometimes enhanced profitability thanks to better soil microenvironment .

Cultural & Indigenous Significance

- **Sacred groves and Kaavu tradition:** Tree species with spiritual importance—such as *Ficus religiosa* (peepal), *Prosopis cineraria* (vanni), and *Aegle marmelos* (vilvam)—are traditionally conserved in temple groves and rural communities, helping safeguard biodiversity and cultural identity over generations.

- **Forest-based livelihoods & tribal knowledge:** Tribal communities like the Irula actively restore native species such as *Madhuca longifolia* (iluppai) and *Diospyros paniculata*, valued for their medicinal, nutritional, and ecological qualities. Social initiatives (e.g. Growtree.org) successfully planted ~85,000 native saplings—creating ~7,000 workdays for tribal groups in Tamil Nadu .



Adoption Challenges & Policy Framework

Barriers Identified by Farmers (across 9,000 surveyed)

- Labour scarcity and high wages
- Poor quality of planting materials and lack of high-yielding clones
- Weak extension services and low technical support
- Unreliable market information, price fluctuations
- Lack of tree-specific credit or insurance facilities

Institutional & Policy Responses

- **National Agroforestry Policy (2014):** India's first national-level framework promoting tree-crop-livestock integration for income, environmental goals, and increased tree cover .
- **State-driven programs:** Example: Tree Cultivation in Private Lands (TCPL) initiative has supported tens of thousands of farmers (~140,000 ha). Tamil Nadu pioneered identification of 25 priority native species and recovery plans for them .
- **Consortium-based industry farm linkages:** The TIP ("Consortium of Industrial Agroforestry") model across TNAU, Forest College & industry actors provides planting material quality control, contract buy-back, insurance schemes, and technical training to address supply chain constraints.

Species Roles & Ecosystem Services

Species / System	Ecological / Environmental Role	Economic / Cultural Role
<i>Ailanthus excelsa</i> , teak, melia	Fast biomass growth, soil reclamation	Industrial pulp/fuel source; strong adoption via contracts
Mango, Amla, Guava, Papaya, Lemon	Fruit production, soil cover, diversity	Marketable yield + home consumption; diversified income
<i>Acacia leucophloea</i> + <i>Cenchrus</i>	Nitrogen fixation, grazing fodder, erosion control	Livestock feed; regenerates pasture lands
<i>Madhuca longifolia</i> , <i>Diospyros paniculata</i>	Pollinator support, fertility, medicinal benefits	Traditional medicine, oil/fuel; cultural significance
<i>Ficus spp.</i> , <i>Prosopis cineraria</i> , <i>Aegle marmelos</i>	Water retention, biodiversity habitat	Sacred grove species tied to rituals, local identity

These species enhance climate adaptability, ecological resilience, cultural continuity, and multiple income streams—truly embodying multifunctional AFS systems .

Summary & Data Highlights

- **Productivity & Economics:** Industrial agroforestry systems yield ~25 m³/ha/year biomass and deliver benefit-cost ratios >3:1.
- **Scale and impact:** Value-chain agroforestry efforts since 2005 have expanded over 80,000 ha, involving extensive farmer coordination, contract farming, and market linkages .
- **Adoption drivers:** Scarcity of labor, attractive economic returns from tree components, lower input needs, and better risk profiles drive AFS adoption across zones .
- **Policy frameworks:** National and state policies, along with institutional partnerships (e.g. TNAU, IFGTB and CIAF), have bolstered agroforestry adoption and proper species targeting.