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AGROFORESTRY POLICY OF TAMIL NADU INDIA: A REVIEW OF CHALLENGES, STRATEGIES AND FUTURE DIRECTIONS

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ABSTRACT

Agroforestry is a sustainable land-use system that integrates agricultural crops, tree species and livestock within the same land unit, creating a complementary and mutually beneficial production system. In Tamil Nadu, agroforestry has been traditionally practiced across diverse agro-climatic regions, although largely without systematic scientific management. In recent years, the sector has gained momentum with the expansion of industrial agroforestry and increasing policy support. Agroforestry plays a crucial role in enhancing farm productivity, improving livelihood security and contributing to environmental sustainability. It is particularly significant in addressing the challenges of declining farm income, land degradation and climate variability, while also supporting the national target of achieving 33% forest and tree cover. This review provides a comprehensive analysis of agroforestry in Tamil Nadu, with a focus on the Tamil Nadu Agroforestry Policy (2026). It examines agroforestry systems across different agro-climatic zones, major tree species and crop combinations and the role of government initiatives and institutional support in promoting tree-based farming. The paper also highlights key challenges, including regulatory constraints, market uncertainties and limited access to quality inputs. Finally, it outlines strategic interventions and future directions required to strengthen agroforestry adoption and ensure sustainable and climate-resilient agricultural development in the state.
Keywords Agroforestry, Climate-resilient agriculture, Sustainable land use, Tree based farming.

Introduction

Agroforestry has emerged as a sustainable land-use system that integrates trees with crops and livestock to enhance productivity, ecological stability and livelihood security (Saikia *et al*., 2017). By combining agricultural and forestry components, it provides a multifunctional approach to address key challenges such as land degradation, climate variability and declining farm incomes (Naik *et al*., 2025). In India, particularly in Tamil Nadu, agroforestry has traditionally been practiced across diverse agro-climatic regions and has gradually evolved from indigenous knowledge systems into more structured and policy-driven approaches (Jambulingam and Fernandes, 1986). The significance of agroforestry has increased in recent years due to the rising demand for forest-based resources and the growing pressure on natural forests. As highlighted in the Tamil Nadu Agroforestry Policy (2026), the state's forest and tree cover accounts for about 24.47% of its geographical area, which is below the national target of 33%. This gap underscores the urgent need to expand tree cover outside forests through agroforestry interventions. At the national level, India has also committed to ambitious climate targets, including achieving net-zero emissions by 2070 and enhancing carbon sinks under its Nationally Determined Contributions (NDCs) (Ogungbemi and Dagbasi, 2025). These commitments necessitate a substantial increase in tree cover, particularly through trees grown outside forests. Changing climatic patterns, especially erratic rainfall, have increased the vulnerability of agriculture, making farming a high-risk and less productive enterprise (Ammaiyappan *et al*., 2023). Under such conditions, agroforestry offers a viable strategy by improving microclimatic conditions, conserving natural resources

and providing additional sources of income and livelihood opportunities for farmers. Furthermore, the increasing demand for wood and wood-based products has brought agroforestry into sharper focus as a sustainable alternative to reduce dependence on natural forests while supporting industrial requirements (Adugna and Etafa, 2024).

In recent years, agroforestry development has gained momentum due to supportive policy frameworks and market-driven opportunities. The introduction of the National Agroforestry Policy during 2014 marked a significant milestone in promoting tree-based farming systems by addressing regulatory constraints, strengthening institutional coordination and improving access to markets and quality planting materials (Dhillon, 2025). In Tamil Nadu, this has contributed to the expansion of industrial agroforestry, where farmers increasingly adopt commercially oriented tree-based systems due to higher economic returns and assured market linkages. At the same time, traditional agroforestry systems continue to play a vital role in maintaining ecological balance and enhancing livelihood resilience (Saravanan and Berry, 2021). Beyond economic benefits, agroforestry contributes significantly to environmental sustainability and climate resilience. These systems enhance carbon sequestration, improve soil fertility, conserve water resources, and support biodiversity (Daba and Dejene, 2018). They also provide diversified outputs such as timber, fuelwood, fodder and fruits, thereby reducing risks associated with monocropping systems. However, the increasing preference for fast-growing species in industrial agroforestry raises concerns related to monoculture practices, market dependency, and long-term ecological sustainability, emphasizing the need for balanced and well-regulated approaches (Nunow *et al*., 2025). Despite its potential, the adoption of agroforestry remains constrained by several factors, including limited access to credit, labour shortages, market uncertainties and regulatory barriers. In addition, variations in institutional support, extension services, and farmer awareness influence the effectiveness of agroforestry initiatives across regions. In this context, agroforestry policies play a critical role in facilitating the transition towards sustainable and climate-resilient agricultural systems. A comprehensive understanding of these policies, supported by empirical evidence and field-level experiences, is essential to identify existing gaps, strengthen implementation strategies and promote balanced agroforestry development. Therefore, this review aims to examine agroforestry policies with a focus on their contributions, challenges and future prospects for sustainable agriculture in Tamil Nadu.

Agroforestry Statistics

The total area under agroforestry across the 15 agro-climatic zones (ACZs) of India is estimated to be 28.43 million hectares, representing approximately 8.65% of the country's total geographical area (328.75 million hectares) (Table 1). A higher share of agroforestry (>10%) is observed in seven zones (ACZs 1, 3, 5, 7, 11, 12 and 13). In terms of area coverage, six zones (ACZs 1, 5, 7, 10, 11 and 13) individually contribute more than 2 million hectares. The Northern Himalayan Region and the Eastern Plateau and Hill Region stand out with agroforestry areas exceeding 4 million hectares. The Upper Gangetic Plains exhibit the highest proportion (15.55%), whereas the Western Dry Region (2.45%) and the Island Region (2.42%) record the lowest values (Dhillon, 2025). Agroforestry plays a significant role in enhancing carbon sequestration and contributing to climate change mitigation (Ghale *et al*., 2022). Despite existing challenges, India has recorded a modest increase in total carbon stocks, reaching approximately 7,285.5 million tonnes an increase of 81.5 million tonnes compared to previous assessments. The annual carbon stock increment is estimated at 40.75 million tonnes, equivalent to 149.42 million tonnes of CO_2, highlighting the growing importance of tree-based systems in strengthening the country's carbon sink potential (Mansingh *et al*., 2025). A substantial proportion of carbon is stored in soil organic carbon (55.06%), followed by above-ground biomass (32.69%) and below-ground biomass (10.09%), while litter and deadwood contribute only marginally (Swamy *et al*., 2023). These statistics underscore the importance of integrating trees within agricultural landscapes to enhance both biomass and soil carbon storage. Moreover, unlike mature trees, which often exhibit a balance between growth and litterfall, young and fast-growing tree species commonly used in agroforestry and block plantations demonstrate higher carbon sequestration potential, contributing significantly over shorter rotation periods. However, these benefits remain unevenly distributed, as more than 40% of India's forest areas are degraded or under-stocked, thereby limiting their overall carbon sequestration capacity (Ramachandra *et al*., 2020). In this context, agroforestry emerges as a sustainable land-use system capable of restoring degraded lands, improving farm productivity, and enhancing ecological resilience. Furthermore, in line with its climate commitments, India aims to create an additional carbon sink of 0.03 Pg CO_2 by 2030, which necessitates a substantial expansion of tree cover (Lopez *et al*., 2025). Agroforestry, particularly in states like Tamil

Nadu where farm forestry and tree-based systems are gaining momentum, offers a practical and scalable pathway to achieve these targets while ensuring livelihood security for farmers.

Tree cover on agricultural lands contributes not only to biomass accumulation but also to soil carbon enhancement, thereby improving overall terrestrial carbon stocks (Olorunfemi *et al*., 2022). Agroforestry is increasingly recognized as a cost-effective strategy for climate change mitigation, while also supporting broader environmental goals such as biodiversity conservation and sustainable land-use intensification (Saikia *et al*., 2017). In addition, it contributes to achieving land degradation neutrality, aligning with global sustainability targets such as the United Nations Sustainable Development Goals (SDGs). Despite its potential, the expansion of agroforestry in India has historically been constrained by several institutional and structural barriers. These include regulatory restrictions on tree harvesting and transportation, limited institutional support, inadequate availability of quality planting material, weak market infrastructure, lack of post-harvest processing facilities and insufficient access to credit and insurance. Furthermore, the absence of a strong extension system has hindered the widespread adoption of agroforestry practices. In India, a substantial proportion of timber demand approximately 65% is met through trees grown on farmlands, emphasizing the importance of agroforestry in meeting industrial and domestic wood requirements (Bansal, 2024). However, in Tamil Nadu, the sector is governed by multiple regulatory frameworks, including various acts and rules related to tree felling and transit, which have historically influenced the adoption of agroforestry practices. The Government of Tamil Nadu has initiated several measures to promote agroforestry under broader environmental and forestry programs. Notably, the "Green Tamil Nadu Mission" aims to increase forest and tree cover in the state to 33% by 2030, in alignment with national forest policy targets. Agroforestry is recognized as a key strategy to achieve this goal, particularly through the expansion of trees outside forests. Estimates suggest that the agroforestry area in Tamil Nadu is around 1.12 million hectares, indicating substantial scope for further expansion and development of tree-based farming systems in the state.

Table 1 : Extent of Agroforestry Area in 15 Agro-Climatic Zones (ACZs) of India

ACZ No.	Agro-climatic Zone (ACZ)	Geographical Area (M ha)	Agroforestry Area (M ha)	Agroforestry Area (%)
1	Northern Himalayan Region	32.968	4.096	12.42
2	Eastern Himalayan Region	28.422	1.088	3.83
3	Lower Gangetic Plains Region	6.238	0.802	12.86
4	Middle Gangetic Plains Region	16.526	1.304	7.89
5	Upper Gangetic Plains Region	14.367	2.234	15.55
6	Trans Gangetic Plains Region	11.75	1.143	9.73
7	Eastern Plateau and Hill Region	40.525	4.292	10.59
8	Central Plateau and Hill Region	37.435	1.924	5.14
9	Western Plateau and Hill Region	32.539	1.556	4.78
10	Southern Plateau and Hill Region	39.294	2.976	7.57
11	East Coast Plains and Hill Region	19.948	2.36	11.83
12	West Coast Plains and Hill Region	11.69	1.632	13.96
13	Gujarat Plains and Hill Region	18.673	2.57	13.76
14	Western Dry Region	17.587	0.431	2.45
15	The Island Region	0.785	0.019	2.42
Total		328.75	28.43	8.65

Steps Taken to Promote the Agroforestry in India

India has undertaken several policies, institutional and programmatic initiatives to promote agroforestry as a sustainable land-use system that enhances productivity, strengthens rural livelihoods and contributes to environmental conservation. Over the years, these efforts have focused on creating an enabling framework to expand tree cover outside forests and integrate agroforestry into mainstream agriculture. A major milestone in this direction was the introduction of the National Agroforestry Policy during 2014, which provided a comprehensive framework for the development of agroforestry in the country. The policy aimed to simplify regulatory procedures, improve institutional coordination, enhance access to quality planting material and strengthen market linkages for agroforestry products. It also emphasized

increasing tree cover on farmlands to reduce pressure on natural forests (Chavan *et al*., 2015).

To operationalize the policy, the Government of India launched the Sub-Mission on Agroforestry (SMAF) during 2016-17 under the National Mission for Sustainable Agriculture (NMSA). This initiative promotes tree plantation on farmlands alongside crops. It provides financial assistance, supports nursery development and strengthens capacity-building and extension services to encourage farmers to adopt agroforestry practices. Research and development in agroforestry have been strengthened through national institutions such as the Indian Council of Agricultural Research (ICAR) and the Indian Council of Forestry Research and Education (ICFRE). The All India Coordinated Research Project on Agroforestry (AICRP-AF), led by ICAR-CAFRI, has played a key role in developing region-specific agroforestry models, improving tree-crop combinations and addressing location-specific challenges. Several other initiatives have also focused on expanding tree cover outside forests. Programs such as Trees Outside Forests (TOF) aim to increase tree cover across different states by promoting agroforestry practices that support both livelihoods and ecosystem services (Rizvi *et al*., 2024). Similarly, the Greening and Restoration of Wastelands (GROW) initiative by NITI Aayog emphasizes the use of agroforestry for restoring degraded lands and enhancing carbon sequestration. Policy support has also been extended through regulatory reforms. Many states have simplified rules related to tree felling and transit of farm-grown timber, thereby reducing legal barriers and encouraging farmers to integrate trees into their farming systems. In addition, the Indian Forest and Wood Certification Scheme implemented during 2023 which promote sustainable forest and agroforestry practices by ensuring better market access and value addition. Agroforestry has also been integrated into national climate strategies. Initiatives such as the Green India Mission, launched under the National Action Plan on Climate Change (NAPCC), aim to enhance carbon sinks and restore degraded landscapes. These efforts are aligned with India's commitment to creating additional carbon sequestration potential and achieving long-term climate goals.

Market oriented approaches have further strengthened agroforestry development. The involvement of wood-based industries through contract farming, buy-back arrangements and improved value chains has enhanced market access and reduced-price risks for farmers (Ramanan *et al*., 2025). These developments have particularly contributed to the expansion of industrial agroforestry systems in several regions. Despite these initiatives, challenges such as limited awareness, institutional gaps and market uncertainties continue to affect the large-scale adoption of agroforestry. This highlights the need for strengthening policy implementation, improving coordination among stakeholders, and enhancing support systems to fully realize the potential of agroforestry in India.

Agroforestry in Tamil Nadu

Agroforestry in Tamil Nadu is widely practiced across diverse agro-climatic zones and reflects a combination of traditional knowledge and modern scientific interventions. The integration of trees with crops and, in some cases, livestock has contributed significantly to farm productivity, livelihood security and environmental sustainability. Historically, farmers in the state have maintained trees on farmlands to meet their requirements for fuelwood, fodder, timber and other products, highlighting the long-standing importance of agroforestry in rural production systems.

Tamil Nadu's agricultural landscape is predominantly shaped by small and marginal farmers, who account for nearly 93% of total landholders but operate only about 62% of the cultivated land. In contrast, medium and large farmers constitute a mere 7% of landholders while controlling a disproportionate 38% of cultivable land. The average landholding size in the state is approximately 0.75 ha, which is considerably lower than the national average of 1.08 ha, indicating a high level of land fragmentation (Islam *et al*., 2021). This structural constraint poses significant challenges to farm mechanization, productivity enhancement and income generation. At the same time, Tamil Nadu has only about 20.27% forest and tree cover, which falls short of the 33% target set under the National Forest Policy. With a total population of 7.21 crores, of which 51.6% resides in rural areas (including 1.12% tribal population), there exists substantial human resource potential that can be harnessed for promoting agroforestry (Sathishkumar and Natarajan, 2017). Integrating tree cultivation into farming systems offers a viable pathway to enhance rural livelihoods, reduce pressure on natural forests and sustainably meet the growing domestic and industrial demand for wood and related products (Saravanan and Berry, 2021). The structure and adoption of agroforestry systems in the state are influenced by factors such as economic returns, landholding size, climatic conditions, and farmer's preferences (Sangeetha *et al*., 2016). Common systems include agrisilviculture, agrihorticulture, silvipasture and boundary plantations, which are designed to optimize

resource use and generate multiple outputs. Farmers generally prefer tree species that are easy to manage, have minimal competition with crops and offer reliable economic returns (Dhillon, 2025).

A wide range of species is integrated into agroforestry systems in Tamil Nadu. Commercially important species such as teak (*Tectona grandis*), eucalyptus, casuarina, *Melia dubia* and *Ailanthus excelsa* are widely cultivated due to their high market demand and shorter rotation periods. In addition, multipurpose species like neem, pongamia and tamarind are commonly grown along field boundaries, while fruit crops such as mango, guava, amla, and sapota are incorporated to ensure regular income and nutritional security. Table 2 shows that different agro-climatic zones of Tamil Nadu adopt specific agroforestry systems such as agrisilviculture, agrihorticulture, silvipastoral and bund or block plantations based on regional conditions (Saravanan and Berry, 2021).

Table 2 : Agroforestry System in Tamil Nadu

Agro-climatic Zone	Agricultural Components	Agroforestry System	Major Tree Species
North Eastern (NE)	Maize, jowar, bajra, red gram, green gram, black gram, horse gram, chilli, tapioca, cotton, groundnut, gingelly	Agrisilviculture, Agrihorticulture, Block plantation and bund plantation	*Anacardium occidentale, Casuarina equisetifolia, Azadirachta indica, Tectona grandis, Bambusa spp., Pongamia pinnata, Tamarindus indica, Cocos nucifera, Ailanthus excelsa, Albizia lebbeck, Borassus flabellifer, Mangifera indica, Achras zapota*
North Western (NW)	Maize, jowar, bajra, ragi, red gram, green gram, black gram, horse gram, turmeric, tapioca, onion, gingelly, castor, cotton, groundnut	Agrisilviculture, Agrihorticulture, Block plantation and bund plantation	*Ailanthus excelsa, Albizia lebbeck, Delonix alata, Tectona grandis, Pongamia pinnata, Azadirachta indica, Tamarindus indica, Mangifera indica, Achras zapota, Emblica officinalis, Sesbania grandiflora*
Western (W)	Maize, jowar, bajra, Bengal gram, green gram, black gram, red gram, turmeric, tapioca, onion, cotton, groundnut, gingelly, castor	Agrisilviculture, Agrihorticulture, Block plantation and bund plantation	*Tectona grandis, Ailanthus excelsa, Azadirachta indica, Bambusa spp., Albizia lebbeck, Ceiba pentandra, Delonix alata, Pongamia pinnata, Thespesia populnea, Tamarindus indica, Mangifera indica, Psidium guajava, Achras zapota, Moringa oleifera*
Cauvery Delta (CD)	Jowar, bajra, red gram, green gram, horse gram, black gram, turmeric, tapioca, cotton, groundnut, gingelly	Agrisilviculture, Agrihorticulture, Block plantation and bund plantation	*Tectona grandis, Albizia lebbeck, Azadirachta indica, Pongamia pinnata, Tamarindus indica, Mangifera indica, Achras zapota, Moringa oleifera, Cocos nucifera, Ailanthus excelsa, Bambusa spp., Emblica officinalis*
Southern (S)	Maize, jowar, ragi, Bengal gram, green gram, black gram, horse gram, onion, cotton, tapioca, chilli, groundnut, banana, pepper, gingelly	Agrisilviculture, Agrihorticulture, Block plantation and bund plantation	*Tectona grandis, Azadirachta indica, Ailanthus excelsa, Borassus flabellifer, Thespesia populnea, Tamarindus indica, Mangifera indica, Achras zapota, Emblica officinalis, Moringa oleifera*
High Rainfall (HR)	Green gram, black gram, gingelly	Agrihorticulture	*Tectona grandis, Hevea brasiliensis, Mangifera indica, Emblica officinalis, Artocarpus heterophyllus*

In recent years, agroforestry in Tamil Nadu has undergone a transition towards more commercially oriented industrial models. These systems are characterized by the cultivation of fast-growing tree species, often supported by contract farming arrangements with wood-based industries (Parthiban and Fernandaz, 2017). Such models provide advantages including assured market linkages, access to improved planting material and higher short-term economic returns. At the same time, traditional agroforestry systems continue to play a vital role in maintaining ecological balance, supporting biodiversity and enhancing the resilience of smallholder farmers (Viñals *et al*., 2023).

The Government of Tamil Nadu has undertaken several initiatives to promote agroforestry in the state. During 2021-22, the Tamil Nadu Mission on Sustainable Green Cover in Farmlands (TNMSGCF)

was launched in convergence with the Sub-Mission on Agroforestry (SMAF), under which a large number of tree seedlings have been distributed to farmers to encourage tree planting on agricultural lands. From 2023-24 onwards, agroforestry interventions have been further strengthened under the Rashtriya Krishi Vikas Yojana (RKVY) through support for the production and supply of quality planting material, with ICAR-CAFRI serving as the nodal agency for technical guidance. In addition, the Green Tamil Nadu Mission aims to increase the state's forest and tree cover to 33% by 2030, promote native species of ecological and economic importance and enhance carbon sequestration. The mission also encourages stakeholder participation, including farmers, private organizations and industries, in expanding tree-based systems. Agroforestry is recognized as a key strategy for achieving these targets. Industrial participation has also played a crucial role in the expansion of agroforestry in Tamil Nadu (Parthiban and Fernandaz, 2017). Several industries, including timber, pulp and paper, plywood, and energy sectors, have implemented out-grower schemes to secure raw materials. These initiatives have increased the demand for quality planting material and improved market linkages for farmers, further promoting the adoption of agroforestry practices (Jansirani, 2025). Despite these advancements, agroforestry adoption in Tamil Nadu faces several constraints. Challenges such as labour shortages, high initial investment costs, limited access to quality planting material, inadequate extension services and market uncertainties continue to affect farmers (Mishra and Mishra, 2018). Price fluctuations and the lack of organized marketing systems further reduce profitability, particularly for small and marginal farmers. Institutional barriers and limited awareness of policy provisions also hinder the effective implementation and scaling up of agroforestry systems (Murali *et al*., 2025).

Challenges in Agroforestry

Despite its significant contributions to livelihood security, environmental sustainability and climate resilience, agroforestry adoption in India and Tamil Nadu continues to face several constraints. These challenges are multidimensional, encompassing biophysical, economic, institutional and market-related factors. One of the major biophysical constraints is the competition between trees and crops for essential resources such as light, water and nutrients (Thevathasan *et al*., 2004). This competition can reduce crop yields when compared to monocropping systems, particularly if appropriate species combinations and management practices are not followed. In addition, certain tree species may act as alternate hosts for pests and diseases, thereby increasing the risk of infestation in associated crops (Kumar *et al*., 2021). The allelopathic effects of some tree species also influence agroforestry performance. The release of chemical compounds by trees into the soil or surrounding environment can inhibit the growth of nearby crops, affecting overall system productivity (Valino *et al*., 2025). Furthermore, the rapid uptake of soil nutrients by trees may lead to localized nutrient depletion, especially in poorly managed systems. Economic constraints also play a significant role in limiting agroforestry adoption. The long gestation period of tree crops delays returns on investment, which discourages small and marginal farmers who depend on short-term income from agriculture. Limited access to institutional credit and financial support further exacerbates this issue (Jansirani, 2025). Labour scarcity is another critical challenge, driven by rural-to-urban migration and rising wage rates. Agroforestry systems often require skilled labour for planting, maintenance, and harvesting operations, making them difficult to manage under labour constrained conditions (Saravanan & Berry, 2021). The lack of quality planting material remains a major bottleneck for scaling up agroforestry. Farmers often face difficulties in accessing certified seedlings and improved clones suitable for different agro-climatic conditions, which affects both productivity and economic returns (Saravanan & Berry, 2021). Market-related challenges further hinder agroforestry development. These include price fluctuations, lack of organized markets, dependence on intermediaries and delayed payments, particularly in contract farming systems. Such uncertainties reduce farmer confidence and discourage long-term investment in tree-based systems (Jansirani, 2025). Institutional and policy-related barriers also persist. Complex regulations governing tree felling and transportation, weak coordination among departments and limited awareness of policy provisions restrict the effective implementation of agroforestry programs (Ghosh *et al*., 2018). In many cases, inadequate extension services and lack of technical guidance limit the adoption of improved practices (Norton and Alwang, 2020). Environmental and climatic factors add another layer of complexity. Irregular rainfall patterns, drought conditions, pest and disease outbreaks and soil degradation can adversely affect agroforestry systems (Fahad *et al*., 2022). Additionally, the expansion of monoculture-based industrial plantations may reduce biodiversity and lead to unsustainable resource use if not properly managed (Çakmakçı *et al*., 2023). Addressing these constraints

is essential to unlock the full potential of agroforestry as a sustainable and climate-resilient land-use system.

Need for The Agroforestry Policy in Tamil Nadu

The need for a comprehensive agroforestry policy in Tamil Nadu arises from the increasing pressure on natural resources, changing climatic conditions and the necessity to enhance farmer's livelihoods (Basu, 2014). Although agroforestry has been traditionally practiced in the state for a long time, it has largely remained unorganized and lacks scientific management in many regions. With the growing importance of industrial agroforestry and the need to achieve the national target of 33% forest and tree cover, agroforestry has emerged as a crucial strategy to expand tree cover outside forests while supporting rural incomes. Climatic variability, including frequent cyclones, floods, and erratic rainfall, has increased the vulnerability of agricultural systems in Tamil Nadu (Ammaiyappan *et al*., 2025). These challenges have encouraged farmers to adopt tree-based systems as a risk mitigation strategy, as agroforestry enhances resilience by improving microclimatic conditions and providing additional income sources (Pancholi *et al*., 2023). In this context, agroforestry plays an important role in stabilizing farm productivity and reducing climate-related risks. The predominance of small and marginal landholders in Tamil Nadu further strengthens the need for agroforestry policy interventions. Agroforestry systems offer diversified production options by integrating crops, trees and livestock, thereby improving income stability, livelihood security and food availability. Such systems are particularly beneficial for smallholders who depend heavily on agriculture for their sustenance (Ramanan *et al*., 2025). Water resource management is another critical factor driving the need for agroforestry. Agroforestry based watershed approaches can enhance water conservation, improve groundwater recharge and increase water-use efficiency (Pabst *et al*., 2025). This is especially important in Tamil Nadu, where erratic rainfall patterns and overexploitation of groundwater resources pose serious challenges to agricultural sustainability. Agroforestry also contributes significantly to biodiversity conservation by providing habitats for various species, preserving genetic diversity and supporting ecosystem restoration (Vijaykumar *et al*., 2024). In addition, it plays a key role in rural development by generating employment opportunities, promoting entrepreneurship, and strengthening local economies.

Food and nutritional security further highlight the importance of agroforestry policy. By integrating food crops with fruit and nut trees, agroforestry systems contribute to diversified diets and improved nutritional outcomes at both household and community levels (Nuwarapaksha *et al*., 2024). From an economic perspective, agroforestry helps bridge the gap between the demand and supply of timber and other forest-based products. Since natural forests alone cannot meet this demand, promoting tree cultivation on farmlands becomes essential for ensuring a sustainable supply of raw materials while reducing pressure on forest ecosystems (Sheppard *et al*., 2020). Moreover, agroforestry systems contribute to climate change mitigation and adaptation by enhancing carbon sequestration, improving soil fertility, conserving water and increasing overall system resilience (Abebaw *et al*., 2025). These benefits align with national and global climate commitments, emphasizing the need for policy support. Institutional and regulatory constraints, such as restrictions on tree felling and transport, lack of access to quality planting material, weak market linkages and limited extension services, further necessitate a structured policy framework (Jansirani, 2025). The need for an agroforestry policy in Tamil Nadu is driven by the requirement to increase tree cover, ensure sustainable resource supply, enhance farmer incomes, promote environmental conservation and build climate-resilient agricultural systems. The priority species for promotion in Tamil Nadu, as outlined in the policy, are presented in Table 3. The policy serves as a strategic tool to integrate ecological sustainability with economic development, thereby supporting the long-term transformation of agriculture in the state.

Table 3 : Prioritized Species for Promotion

Prioritized Species	Common Name	Scientific Name
Timber Species	Teak	*Tectona grandis*
	Mahogany	*Swietenia macrophylla*
	Vengai	*Pterocarpus marsupium*
	Poovarasau	*Thespesia populnea*
	Kumil	*Gmelina arborea*
	Vaagai	*Albizia falcataria*
	Sissoo	*Dalbergia sissoo*
High Value Species	Sandal	*Santalum album*
	Red Sanders	*Pterocarpus santalinus*
	Rosewood	*Dalbergia latifolia*
Industrial Wood Species	Melia	*Melia dubia*
	Kadam	*Neolamarckia cadamba*
	Acrocarpus	*Acrocarpus fraxinifolius*
	Ailanthus	*Ailanthus excelsa*
	Toona	*Toona ciliata*
	Chukrasia	*Chukrasia tabularis*
	Kalyana murungai	*Erythrina indica*
	Silver oak	*Grevillea robusta*
	Savukku	*Casuarina*
Tree Borne Oilseeds	Neem	*Azadirachta indica*
	Pungam	*Pongamia pinnata*
	Punnai	*Calophyllum inophyllum*

	Simarouba	*Simarouba glauca*
	Mahua	*Madhuca latifolia*
Non-Timber Forest Products Trees (NTFP)	Thandri	*Terminalia bellerica*
	Kadukai	*Terminalia chebula*
	Manila tamarind	*Pithecellobium dulce*
	Naval	*Syzygium cumini*
	Palmyrah	*Borassus flabellifer*

Key Objectives of The Tamil Nadu Agroforestry Policy-2026

The Tamil Nadu Agroforestry Policy (2026) aims to promote sustainable land-use systems that integrate agricultural production with ecological conservation while enhancing farmer's livelihoods. The policy is designed to address key challenges in agroforestry development and create an enabling environment for the expansion of tree-based farming systems in the state. A primary objective of the policy is to increase green cover outside forests by promoting agroforestry practices across agricultural, wastelands and marginal lands in both public and private sectors. This is intended to bridge the gap between the existing forest cover and the national target while reducing pressure on natural forests. The policy also focuses on enhancing economic viability and livelihood security of farmers by strengthening market linkages, promoting sustainable agroforestry practices and supporting small and marginal farmers. By diversifying farm outputs, agroforestry contributes to improved income stability and reduced agricultural risks. Improving soil health and farm productivity is another important objective. Agroforestry systems help enrich soil organic matter, conserve moisture and enhance nutrient cycling thereby supporting long-term agricultural sustainability. A key objective of the policy is to promote climate-resilient agriculture by mitigating the adverse impacts of climate change. Agroforestry systems contribute to carbon sequestration, reduce vulnerability to climate variability and enhance the resilience of farming systems to extreme weather events. The policy emphasizes the promotion of native and climate-resilient tree species to ensure ecological balance, biodiversity conservation and long-term sustainability. It also seeks to reduce dependence on natural forests by encouraging the production of timber and other forest products on farmlands. Strengthening research, development and capacity building is another important objective. The policy supports the development of improved tree varieties, training of farmers and dissemination of scientific knowledge to enhance productivity and innovation in agroforestry systems. The policy also aims to establish effective incentive mechanisms to encourage farmers to adopt agroforestry. This includes providing technical support, improving access to quality planting materials, developing nursery infrastructure and promoting financial incentives such as carbon credits and payment for ecosystem services. Ensuring a continuous supply of fodder for livestock is another objective, contributing to improved livestock productivity and supporting integrated farming systems. The policy further focuses on strengthening the availability of certified quality planting materials by improving accreditation systems for nurseries and enhancing the production and distribution of high-quality seedlings. Another important objective is to develop robust monitoring and documentation systems for agroforestry areas through digitization and improved record-keeping, ensuring transparency and better planning. The policy also encourages collaboration with national and international organizations to access carbon markets and promote agroforestry as a climate-positive solution. Finally, the policy aims to integrate agroforestry into financial and insurance systems, including crop loans and tree insurance schemes, while promoting green finance and encouraging industries to utilize agroforestry outputs through structured market arrangements.

Strategies to Achieve the Agroforestry in Tamil Nadu

The Tamil Nadu Agroforestry Policy adopts a multi-dimensional strategy to create an enabling ecosystem for the expansion of agroforestry in the state. These strategies focus on strengthening institutional frameworks, improving input supply systems, enhancing market access and promoting research and capacity building. A key strategy is the establishment of strong institutional support mechanisms. A State Agroforestry Board is proposed to coordinate activities across multiple departments, including agriculture, forestry, horticulture, and industries. This institutional framework is intended to ensure convergence, improve coordination and facilitate effective implementation of agroforestry initiatives. At the state and district levels, dedicated committees and monitoring systems are envisaged to track progress and streamline interventions. In addition, specialized units within relevant departments will support planning and execution, while research institutions will provide technical guidance. Regulatory reforms form another important component of the strategy. Simplification of procedures related to tree harvesting and transportation, along with relaxation of restrictions on selected species, is aimed at encouraging farmers to adopt agroforestry. At the same time, policy measures will ensure that sustainability

standards and export requirements are addressed to promote both domestic and international market opportunities. The identification of potential areas and suitable agroforestry models is also emphasized. Wastelands, marginal lands and underutilized areas will be prioritized for agroforestry expansion. Location-specific models based on agro-climatic conditions, soil characteristics, and water availability will be promoted. Community-based approaches involving farmer groups, self-help groups and local institutions will be encouraged to expand agroforestry practices in common lands and shared resources. Ensuring the availability of quality planting material is a critical strategy for improving productivity. Strengthening nursery infrastructure, promoting certified planting stock and establishing accreditation systems for nurseries will help ensure the supply of high-quality seedlings. Public and private sector participation will be encouraged to meet the increasing demand for planting materials. Capacity building and extension services are also central to the strategy. Training programs for farmers, field-level functionaries and extension personnel will be strengthened to enhance knowledge on agroforestry practices, species selection and management techniques. Existing extension networks, including agricultural universities and field institutions, will be leveraged to disseminate location-specific technologies and best practices. Improving market linkages and value addition is another major focus area. Efforts will be made to strengthen farmer's access to markets through better price discovery mechanisms, digital platforms and integration with national agricultural marketing systems. The development of dedicated platforms for information sharing, buyer-seller interaction and real-time market intelligence will support efficient marketing of agroforestry products. Encouraging industry participation and promoting value addition will further enhance farmer's income.

Financial incentives and risk mitigation measures are also emphasized to make agroforestry economically attractive. Access to credit, insurance coverage for tree crops and convergence with existing government schemes will be strengthened. Innovative mechanisms such as carbon credit frameworks and green finance initiatives will be explored to provide additional income opportunities for farmers. Research and innovation form an integral part of the strategy. Focus will be placed on developing high-yielding, short-rotation, and site-specific tree species, as well as optimizing tree–crop combinations. Collaborative research among institutions will be encouraged to generate practical solutions and improve system productivity. The dissemination of research findings through digital platforms will ensure wider accessibility and faster adoption. Their effective implementation is expected to accelerate the adoption of agroforestry, enhance farmer livelihoods, and contribute to sustainable and climate-resilient agriculture in Tamil Nadu.

Way Forward

The future development of agroforestry in Tamil Nadu depends on strengthening implementation mechanisms, improving institutional coordination and adopting a holistic approach that integrates economic, environmental and social objectives. While the policy framework provides a strong foundation, focused and time-bound actions are essential to achieve its intended outcomes. A key priority is to establish robust institutional arrangements to ensure long-term planning, coordination and monitoring of agroforestry initiatives. Strengthening governance structures at state and district levels, along with clear operational guidelines and accountability mechanisms, will facilitate effective policy implementation. The identification and development of region-specific agroforestry zones is another important step. Delineating suitable areas based on agro-climatic conditions, soil characteristics and resource availability will help promote location-specific agroforestry models. Dissemination of information, education and communication materials on proven models will further enhance adoption among farmers. Strategic planning for the production and supply of agroforestry species is essential. Developing species-wise and time-bound action plans will ensure a consistent supply of planting material aligned with regional requirements and market demand. Ensuring the availability of high-quality planting material through standardized nursery certification systems is also critical. Establishing institutional mechanisms for nursery accreditation, quality control, and rating systems will improve the reliability and performance of agroforestry plantations. The development of digital platforms and single-window systems can significantly enhance service delivery. Dedicated portals for information dissemination, farmer registration, plantation tracking, and simplified approval processes for tree harvesting and transport will reduce procedural delays and improve transparency. Convergence of schemes and programs is another important strategy for scaling up agroforestry. Aligning initiatives of the Government of India and the Government of Tamil Nadu will help optimize resource use, provide financial incentives, and ensure coordinated implementation across sectors. Strengthening market systems and value chains is essential to enhance farmer income. Developing

organized markets, improving price discovery mechanisms, promoting value addition and processing industries will increase the economic viability of agroforestry. Encouraging farmer producer organizations and industry partnerships can further strengthen market linkages. Providing financial support and risk mitigation mechanisms is crucial for wider adoption. Expanding access to credit, insurance schemes, and innovative financing options such as carbon credits and green finance will help address the challenges associated with long gestation periods and income uncertainty. From an environmental perspective, promoting diversified and climate-resilient agroforestry systems is essential. Encouraging mixed-species plantations and sustainable management practices will enhance biodiversity, improve soil health, and increase resilience to climate variability. Research, innovation and knowledge dissemination must be strengthened to support evidence-based decision-making. Developing improved tree varieties, optimizing agroforestry models and enhancing collaboration among research institutions will accelerate technological advancements in the sector. Finally, enhancing farmer awareness and community participation is vital for the long-term success of agroforestry. Capacity-building programs, training initiatives, and participatory approaches will empower farmers to adopt and sustain agroforestry practices, ensuring inclusive and equitable development.

Conclusions

Agroforestry in Tamil Nadu represents a viable pathway for achieving sustainable and climate-resilient agriculture, particularly in the context of small and fragmented landholdings and increasing environmental challenges. The Tamil Nadu Agroforestry Policy (2026) provides a comprehensive framework to promote tree-based farming systems, enhance tree cover outside forests and strengthen rural livelihoods. The agroforestry systems in the state are diverse and adaptable, offering multiple benefits including carbon sequestration, soil improvement, biodiversity conservation and income diversification. However, the sector continues to face constraints such as limited access to quality planting material, market uncertainties, labour shortages and regulatory complexities. Addressing these challenges requires strengthening institutional coordination, improving extension services, enhancing market and value chain linkages. Future efforts should focus on promoting region-specific and diversified agroforestry models, leveraging technological, financial innovations and ensuring effective policy implementation. Finally, agroforestry holds significant potential to contribute to sustainable agricultural development and long-term environmental resilience in Tamil Nadu.

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