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Research Article

# STUDY TO ACCESS THE ESTABLISHMENT AND MAINTENANCE COST OF MULBERRY GARDEN IN TIRUPPUR AND COIMBATORE REGION OF TAMIL NADU

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## ABSTRACT

This study aims to assess the establishment and maintenance costs of mulberry gardens in the major sericultural tracts of Tamil Nadu, focusing on economic viability and cost structure from a business and economist's perspective. Primary data were collected from selected districts including Coimbatore and Tiruppur (Udumalpet) region through structured farmer interviews and field observations. The establishment cost for one acre of mulberry garden in the first year was estimated at ₹36,000, encompassing land preparation, planting material, manure, fertilizers, drip irrigation maintenance and labour. From the second year onwards, the annual maintenance cost increased to ₹60,000 per acre, primarily due to operational costs such as shoot harvesting, weeding, pruning, fertilizer application and irrigation operation cost. The unit cost of leaf production was found to be ₹2.50 per kg, indicating the potential for reasonable profitability when linked to cocoon yield and market price. Economically, the investment in mulberry cultivation is justified when costs are amortized over the productive lifespan of the garden, typically 10–15 years. The study highlights the importance of cost-effective resource management, labour optimization and policy support for enhancing profitability in sericulture. These findings offer practical economic insights for farmers, agribusiness planners and policymakers aiming to strengthen the sericulture sector in Tamil Nadu.

**Keywords:** Economics, Establishment cost, Leaf production cost, Maintenance cost, Mulberry cultivation, Sericulture.

## INTRODUCTION

Sericulture, the art and science of rearing silkworms for the production of silk is a vital agro-based industry that provides sustainable income to rural populations in India (Vijayan *et al.,* 2023). Among the key inputs in sericulture, mulberry (*Morus* spp.) cultivation plays a pivotal role as it is the sole food source for the silkworm *Bombyx mori* (Dandin, 2003). The success of silk production depends significantly on the quality and quantity of mulberry leaves available which are directly influenced by the agronomic practices and economic inputs associated with mulberry garden management (Saini *et al.,* 2023).

Tamil Nadu is among the leading states in India for sericulture development, thanks to its favourable climate, strong government support and well-established farmer networks. (Vijayan *et al.,* 2023). Districts such as Tiruppur (Udumalpet) and Coimbatore are notable sericultural tracts in the state, where mulberry cultivation is practiced intensively (Balakrishna *et al.,* 2009). However, the economic aspects of establishing and maintaining mulberry

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gardens vary widely across regions due to differences in soil type, irrigation practices, landholding size and cultivation methods (Dandin *et al.,* 2003).

Understanding the cost structure involved in the establishment and maintenance of mulberry gardens is essential for farmers, extension workers, policymakers and researchers (Mallick and Sengupta, 2022). Establishment costs generally include land preparation, planting material procurement, pit or bed formation, irrigation infrastructure and initial fertilization (Ssemugenze *et al.,* 2023). Maintenance costs encompass routine operations such as irrigation, weeding, pruning, fertilization, pest and disease control and labour charges (Kumar *et al.,* 2022).

Despite the importance of cost analysis in mulberry cultivation, there is limited region-specific data available especially for the diverse sericultural zones in Tamil Nadu (Sakthivel *et al.,* 2012). This gap hinders informed decision-making for new entrants and existing farmers aiming to enhance profitability (Vijayan *et al.,* 2011). With increasing input costs and changing environmental conditions, it becomes imperative to analyze the economic feasibility of mulberry farming in various agro-climatic conditions (Vijayan *et al.,* 2021).

This study seeks to address this knowledge gap by systematically evaluating the establishment and maintenance costs of mulberry gardens in major sericulture districts of Tamil Nadu. By identifying cost determinants and evaluating the economic sustainability of different cultivation practices, the research will offer valuable insights into resource optimization and cost-effective management (Hawramee *et al.,* 2019). Furthermore, the findings are expected to assist in formulating targeted policies, improving credit access and encouraging more farmers to adopt or expand sericulture as a viable livelihood option.

## MATERIALS AND METHODS

The study was conducted in major sericultural tracts of Tamil Nadu including Tiruppur and Coimbatore districts, which represent diverse agro-climatic and cultivation conditions. A stratified random sampling technique was employed to select 50 mulberry farmers across each region thus ensuring representation of whole region. Primary data were collected through structured interviews using a pre-tested questionnaire. The data were collected from farmers having their own land and already operational drip irrigation setup. The questionnaire encompassed a range of parameters related to establishment costs such as land preparation, planting materials, pit formation, initial fertilization and irrigation setup as well as annual maintenance costs including weeding, irrigation, fertilization, pruning, pest and disease management and labour. Field visits were conducted to validate the responses and observe actual cultivation practices (Chowdhury *et al.,* 2013). Secondary data were obtained from records of the Department of Sericulture in Udumalpet and Coimbatore region under Government of Tamil Nadu and published literature relevant to mulberry cultivation costs. Cost components were standardized on a per-acre basis (Kumar *et al.,* 2022). The results were interpreted to derive practical economic insights for farmers, entrepreneurs and policymakers.

### Fixed Cost

Fixed cost refers to the type of cost that remains constant regardless of the level of goods or services produced or sold. It does not alter in value with changes in production numbers. *Example:* Building construction cost (Raju and Sannappa, 2018).

### Variable Cost

Variable cost includes expenses that change in direct proportion to the level of production. As production increases or decreases, these costs rise or fall accordingly. *Examples*: Cost of silkworms, mulberry leaves, labour charges and chemicals (Manjula and Kumari, 2017).

### Unit Cost

Unit cost refers to the total cost incurred to produce, store and sell one unit of a product or service. It is determined by dividing the overall production cost which includes both fixed and variable expenses, by the total number of units produced. Unit cost is a key indicator of production efficiency and helps in pricing decisions (Amarnath and Karthik, 2014).

## RESULTS AND DISCUSSION

The establishment cost for one acre of mulberry garden during the first year in Tamil Nadu's coimbatore and tiruppur sericultural regions amounts to ₹36,000. This initial investment includes all necessary operations for land preparation, planting and maintenance to ensure a healthy and productive crop (Balakrishnan *et al.,* 2009). Economically, this cost represents a capital investment that lays the foundation for long-term income through silk cocoon production (Sakthivel *et al.,* 2012). Key expenditures include ploughing (₹2,400) and bund formation (₹1,200), which are essential one-time land development activities. The application of farmyard manure (8 tonnes costing around ₹8,000) and labour charges for application (₹1,800) support soil fertility and plant establishment. The purchase of 6,000 mulberry saplings at ₹0.50 each (₹3,000) and the planting labour (₹3,000) represent critical planting and labour inputs. Chemical fertilizers (₹3,000) and their application (₹3,600) ensure adequate nutrient availability during early growth stages. Drip irrigation maintenance costs ₹2,000, emphasizing the need for efficient water management (Dandin and Kumari, 2021). Hoeing and weeding, performed three times annually (₹6,000 total), along with ₹2,000 in miscellaneous expenses considerably contributes to the total cost as in Table 1.

**Table 1. Establishment cost of mulberry garden acre per year (I year).**

| Sl. No. | Particulars | Value (Rs.) |
|---|---|---|
| 1. | Ploughing operations (3hrs * 800 Rs/hr) | 2400.00 |
| 2. | Bund former (2hrs * 600 Rs/hr) | 1200.00 |
| 3. | Farm yard manure (8 tonnes) @ Rs.1000/T. | 8000.00 |
| 4. | FYM application cost (3 mandays *600 Rs/hr) | 1800.00 |
| 5. | Mulberry plants- 6000 saplings @ Rs.0.50/sapling | 3000.00 |
| 6. | Pit making and planting cost (5 mandays *600 Rs/hr) | 3000.00 |
| 7. | Fertilizer cost | 3000.00 |
| 8. | Fertilizer application charges (6 mandays *600 Rs/hr) | 3600.00 |
| 9. | Irrigation (Drip) maintenance charge | 2000.00 |
| 10. | Hoeing/Weeding operations @ 3 times/ yr (2000 Rs x 3 times) | 6000.00 |
| 11. | Miscellaneous expenditure | 2000.00 |
| | **Total establishment cost** | **36,000.00** |

**Table 2. Maintenance of mulberry garden (from II year onwards).**

| Sl. No. | Particulars | Value (Rs.) |
|---|---|---|
| **A.** | **Operational costs** | |
| 1. | Farm yard manure (8 Tonnes) @ Rs.1000/T. | 8000.00 |
| 2. | FYM application cost (3 mandays *600 Rs/hr) | 1800.00 |
| 3. | Fertilizer cost | 3000.00 |
| 4. | Fertilizer application charges (6 mandays *600 Rs/hr) | 3600.00 |
| 5. | Irrigation (Drip) maintenance charge | 2000.00 |
| 6. | Hoeing/Weeding operations @ 3 times/ yr (2000 Rs x 3 times) | 6000.00 |
| 7. | Shoot harvesting cost | 24000.00 |
| 8. | Pruning and cleaning of plants @ 3 times/ yr (2000 Rs x 3 times) | 6000.00 |
| 9. | Miscellaneous cost | 2000.00 |
| | **Total variable cost** | **56,400.00** |
| **B.** | **Fixed costs** | |
| | Approximate cost of establishment of mulberry garden @10% YoY | 3600.00 |
| | **Total leaf production cost** | **60,000.00** |
| | **Total cost/kg of leaf** | **2.50** |

Area under mulberry -1 acre
Mulberry variety - V1
Spacing - (150 + 90) cm. × 60 cm. (paired row system)
Leaf yield - 24,000 kg/acre/year

From an economic perspective, this cost structure reflects a combination of fixed and variable costs. Labour constitutes a significant portion, highlighting the labour-intensive nature of mulberry cultivation. Although these costs are concentrated in the first year, they enable multiple years of leaf production which supports continuous silkworm rearing and cocoon harvests. When averaged over the productive lifespan of the garden (10–15 years), the annual cost becomes economically viable (Vijayan *et al.,* 2023). Thus, a clear understanding of establishment costs is vital for farmers and policymakers to plan investments, assess profitability and promote sustainable sericulture practices in Tamil Nadu (Kumar *et al.,* 2022). The table 2 presents the maintenance cost for a mulberry garden from the second year onward, highlighting both operational (variable) and fixed costs. The total annual maintenance expenditure amounts to ₹60,000 per acre with variable costs accounting for ₹56,400 and fixed costs estimated at ₹3,600 thus assuming a 10% depreciation on the first-year establishment cost (Chowdhury *et al.,* 2013). From an economist's perspective, these costs reflect the ongoing resource inputs required for enhancing leaf productivity crucial for silkworm rearing. The highest single component is shoot harvesting (₹24,000), indicating the labour-intensive nature of mulberry cultivation and the importance of manual labour in the post-establishment phase (Manjula

and Kumari, 2017). Other significant recurring expenditures include farm yard manure (₹8,000), hoeing and weeding (₹6,000) and pruning and cleaning operations (₹6,000), all of which are essential for maintaining plant health and ensuring consistent leaf quality. Fertilizer costs and application (₹6,600 total) and drip irrigation maintenance (₹2,000) further highlight the input-dependency of the system particularly in maintaining soil fertility and water efficiency. Miscellaneous expenses (₹2,000) provide flexibility for minor, unpredictable costs during the cropping cycle (Raju and Sannappa, 2023).

The fixed cost of ₹3,600 annually, derived from 10% interest on the initial establishment cost represents capital recovery over time. When these costs are summed, the total cost of leaf production is calculated at ₹60,000 annually with the unit cost of leaf production being ₹2.50 per kilogram (Mallick and Sengupta, 2022). This detailed cost structure is crucial for economic planning especially in estimating break-even points and profit margins for sericulture farmers. Gaining insight into and effectively managing these costs enables farmers to optimize input usage, minimize waste and improve profitability. (Amarnath and Karthik, 2014). Moreover, these insights can guide policy interventions such as targeted subsidies or training programs aimed at improving resource efficiency and sustainability in mulberry-based sericulture systems in Tamil Nadu.

## CONCLUSION

The economic analysis of establishing and maintaining a mulberry garden in the sericultural tracts of Tamil Nadu reveals important insights for farmers, policymakers and investors. The initial establishment cost of ₹36,000 per acre includes land preparation, planting materials, inputs and labour—representing a one-time capital investment necessary to set up a productive system. From the second year onwards, the annual maintenance cost increases to ₹60,000 per acre with major contributions from labour-intensive activities such as shoot harvesting, pruning, weeding and fertilizer application. The cost of leaf production is estimated at ₹2.50 per kilogram. From a business and economist's perspective, these findings underscore the need for efficient resource utilization and cost management to improve profitability. The high proportion of labour costs suggests potential benefits from mechanization or labour-saving techniques. Additionally, amortizing the establishment cost over the productive life of the garden (10–15 years) improves cost-efficiency and investment viability. The data supports the financial sustainability of mulberry cultivation when paired with efficient silkworm rearing and cocoon marketing. Entrepreneurs and farmers can use this cost framework to assess feasibility, estimate returns and secure institutional credit. Policymakers may also use these insights to design targeted support schemes for enhancing sericulture as a profitable rural enterprise.

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