

CONSTRAINTS ENCOUNTERED BY THE SERICULTURE PRACTICING FARMERS DURING SILKWORM REARING IN TAMIL NADU

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ABSTRACT

Sericulture remains a vital livelihood source for small and marginal farmers in India, particularly in Tamil Nadu, a leading state in mulberry sericulture. Among the various stages, late-age silkworm rearing comprising the 4th and 5th instars is a critical and resource-intensive phase, contributing over 70% of the total cocoon yield. Despite technical and institutional support from various agencies, farmers face multiple constraints that hinder productivity and profitability during this phase. This study was undertaken to identify and rank the major constraints faced by silkworm rearers in Tamil Nadu using Garrett's ranking technique. Data were collected from farmers across the region and analyzed under three categories: mulberry cultivation, silkworm rearing, and cocoon marketing. The findings revealed that the top constraints in mulberry cultivation included lack of drought-resistant varieties and labour scarcity. In silkworm rearing, climate change, disease incidence, and inadequate technical guidance were the major impediments. Marketing challenges such as price fluctuation and lack of transport facilities were also significant. The results underline the need for climate-resilient varieties, better extension services, infrastructural support, and marketing interventions to sustain and scale up silkworm farming in Tamil Nadu.

Keywords: Sericulture, Late-age silkworm rearing, Farmer constraints, Cocoon marketing.

INTRODUCTION

Sericulture, an agro-based rural industry, plays a vital role in improving the livelihood of small and marginal farmers in India. Among the various stages of sericulture, late-age silkworm rearing which refers to the management of silkworms during their 4th and 5th instars is the most crucial and resource-intensive phase, accounting for over 70% of the total cocoon yield (Krishnaswami, 1986). Proper handling, environmental management, and disease control during this period are essential for achieving better silk productivity and quality (Mithilasri *et al.*, 2024). Tamil Nadu is one of the leading states in mulberry sericulture, contributing significantly to India's raw silk production. The state has well-established infrastructure, technical support and research linkages. However, despite various

governmental interventions and training programs, sericulture farmers in Tamil Nadu still face numerous constraints during late-age silkworm rearing, which hinder their productivity and profitability. Several past studies have highlighted the challenges faced by silkworm rearers across different regions. For instance, Ramesh *et al.* (2015) and Arasakumar *et al.* (2024) reported that temperature and humidity control, lack of separate rearing houses, and insufficient labor during peak rearing times were major concerns for farmers in Karnataka and Tamil Nadu respectively. Similarly, Sinha and Suryanarayana (2012) emphasized that disease incidence and poor leaf quality during late rearing stages significantly affect cocoon yield. In Tamil Nadu, Senthil Kumar *et al.* (2018) observed that socio-economic factors such as landholding size, access to

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credit, and technical knowledge strongly influenced the success of late-age rearing.

Late-age silkworm rearing demands intensive care, high-quality mulberry leaf, hygienic rearing environment, and timely preventive measures against diseases such as grasserie and muscardine (Jolly *et al.*, 2000). Farmers often struggle with inconsistent leaf supply, inadequate disinfection practices, and limited access to scientific knowledge. Moreover, smallholder farmers with mixed farming systems often prioritize other agricultural activities, further affecting their rearing performance during the late-age phase. In this context, it becomes imperative to identify and analyze the key constraints encountered by silkworm rearers during the late-age phase, especially in a prominent sericulture state like Tamil Nadu. This study aims to bridge this knowledge gap and provide actionable insights for policymakers, extension workers, and research institutions to improve late-age silkworm management practices and farmer support mechanisms.

MATERIALS AND METHODS

Garrett’s ranking technique

Garrett’s ranking techniques was adopted to analyse the problems faced by farmers in silkworm rearing (cocoon production) and marketing of cocoons during 2023-24. The 135 respondents were asked to rank the given factors that were limiting the production of cocoons and the problems in marketing.

The order of merit thus given by the respondents was converted into ranks using the following formula

$$\text{Percent position} = \frac{100 (R_{ij} - 0.5)}{N_j}$$

Where,

- R_{ij} = Rank given for ith factor by jth individual.
- N_j = Number of factors ranked by jth individual.

By referring to the Garrett’s table, the per cent positions estimated were converted into scores. Thus, for each factor, the scores of the various respondents were added and the mean value was estimated. The means thus obtained for each of the attributes were arranged in descending order. The attributes with the highest mean value were considered as the most important one and the others followed in that order. The per cent position of each rank thus obtained was converted into scores by referring to tables given by Garrett.

RESULTS AND DISCUSSION

The interview was conducted to brought out constrains faced by the sample respondents in mulberry cultivation, silkworm rearing and marketing of cocoons in the study area. The responses were ranked using the Garrett’s ranking technique. The details are furnished in table 1 to 3. The current study has been observed that lack of drought resistance variety is the first and as a foremost constraint which were experienced by farmers. The requirement of high capital towards payment of wages and inadequate labour availability was the next major problems of silkworm rearers. Lack of technical guidance was another constraint expressed by majority of the farmers. Due to the inadequate credit facility for investments towards establishment and maintenance of mulberry garden was ranked as fourth constraint experienced by the farmer. Department of Sericulture of Government of Tamil Nadu, Ministry of khadi and village industries, Central silk board have formed several training programmes for mulberry growers in all districts, as well as the formation of specific agribusiness consortium for availing loan facility for infrastructure development such as, machineries for leaf picking and chopping, silkworm rearing yard with required tools and machineries.

Table1. Constrains faced by the farmers in mulberry cultivation.

Constrains in mulberry garden	Mean score	Rank
Lack of drought resistant variety	87.55	I
Scarcity of labour	87.13	II
High wage rate	86.88	III
Inadequate credit facilities	84.13	IV
Inadequate technical guidance	83.64	V
Lack of high yielding variety	83.48	VI
Incidence of pest and diseases	81.11	VII
Inadequate supply of cutting	80.60	VIII
Incidence of disease	80.06	IX
Scarcity of water	77.97	X

From the table 1 it could be inferred that majority of the farmers were facing supply constraints regarding shortage of improved or high yielding variety of mulberry, incidence of pest and diseases, planting material, scarcity of water and trustworthy DFLs sources. The constraint experienced

by the farmers address their problem by advancing the cuttings or saplings of high yielding variety prior to the season to Department of Sericulture and Central Silk Board for timely through supply.

Table 2. Constrains faced by the farmers in silkworm rearing.

Constrains in silkworm rearing	Mean score	Rank
Climate change	87.53	I
Incidence of pest and diseases	87.51	II
Lack of technical guidance	87.28	III
Inadequate quality of chawki worms	84.53	IV
Inadequate transport facilities	84.17	V
Improper sanitation	83.28	VI
Scarcity of labour	83.11	VII
High wage rate	82.80	VIII
Lack of skilled labourers for rearing	81.60	IX
High disinfectants cost	77.97	X

The current investigation is clear that natural constraint like climate change ranks first and major problem expressed by the farmers. The congenial relative humidity and temperature are an essential factor of rearing of silkworms and whenever the failure of it for example, the climate change, natural disaster, make unworthy of taking up silkworm rearing and the entrepreneur become bankrupt and drop the rearing out rightly. Incidence of pest and diseases ranked second due to the silkworm more susceptible to pest and disease attack thus suggested that extension agencies should intensify their efforts to organize extension educational programmes like trainings, demonstrations, field days, etc., To motivate the farmers to accept and adopt the IPM practices and a special emphasis should be given to promote eco-friendly bio-control methods against insect pests of mulberry and silkworm. Further, the availability of technical inputs should be made easy at the doorsteps of the farmers.

Lack technical guidance like knowledge on disinfectant used for silkworm rearing bed and rearing house, Uzi fly control, pest and disease management practices, proper

sanitization are the major constraint faced by the farmers as expressed by majority of the farmers (87.28%). Attending regular training organized by Department of sericulture would help them to solve the problem effectively. At present labour scarcity (83.11%) is a common problem due to their diversified employment opportunities. Even though they are available, they have to be paid with higher wages and hence majority of the respondents reported that as major problem. Lack of skilled labours ranked ninth. All operations can be carried out properly only when the labourers are to be equipped with adequate technical knowledge about proper rearing activities effectively. The labourers can learn these skills only after some years of their experience and training. Maintenance of optimum temperature, aeration and sunlight is very important for producing quality worms. Many of the respondents could not do it because of lack of awareness and knowledge. The disinfectant larvae should be culled out from the beds then and there so as to prevent the infection to other healthy larvae. But majority of the farmers were not having adequate knowledge in identification of disinfectant chemical and its proper use hence lead to more infection.

Table 3. Constrains faced by the farmers in marketing of cocoons.

Constrains in marketing of cocoons	Mean score	Rank
Price fluctuation	87.64	I
Lack of transport facilities	84.91	II
Lack of finance	81.60	III
Long distance to market	78.28	IV
Less number of cocoon markets	76.24	V

In the present study, it was observed that majority of the farmers facing the problem related to the price fluctuation, high transportation cost due to late age farmers situated far away from cocoon market and drastic price fluctuation of cocoons as marketing constraints which ranked first due to there was no standard price for cocoons per kg. The consortium formation will solve the problem easily through either Department of Sericulture or Central Silk Board. The second constraints faced by 84.91 per cent of the farmers were lack of transport facilities and more transport cost were major problem expressed by many of the respondents. Some villages are far away from cocoon market and the farmers felt the difficulty to transport of cocoons from farmer field to cocoon market. Few farmers had the mode of transport on their own. But many of them depended only on hired vehicles like, van, tempos and buses which lead to more cost of transportation.

CONCLUSION

The study highlights that late-age silkworm rearing in Tamil Nadu is significantly affected by a combination of agronomic, technical, and market-related constraints. Lack of drought-resistant mulberry varieties and labour scarcity were the primary challenges in cultivation, while climate variability and disease outbreaks emerged as the most pressing issues during the rearing phase. Moreover, poor market access and price volatility reduced profitability, discouraging sustained engagement in sericulture. The findings emphasize the urgent need for holistic support including the development of improved mulberry cultivars, skill-oriented training programs, timely credit access, disease management protocols, and market stabilization strategies. Addressing these challenges through coordinated efforts by the Department of Sericulture, Central Silk Board, and research institutions can enhance the resilience, productivity, and income of late-age silkworm rearers in the state.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

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AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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