# International Journal of Research in Agronomy

**Nikita Kankanawadi**
Department of Sericulture, College of Agriculture, University of Agricultural Sciences, Gandhi Krishi Vigyana Kendra, Bengaluru, Karnataka, India

**Manjunath Gowda**
Department of Sericulture, College of Agriculture, University of Agricultural Sciences, Gandhi Krishi Vigyana Kendra, Bengaluru, Karnataka, India

**KH Nagaraj**
Department of Agricultural Extension, College of Agriculture, University of Agricultural Sciences, Gandhi Krishi Vigyana Kendra, Bengaluru, Karnataka, India

**Veenita MK**
Department of Sericulture, College of Agriculture, University of Agricultural Sciences, Gandhi Krishi Vigyana Kendra, Bengaluru, Karnataka, India

# Field-level constraints and information sources in sericulture: A study from Karnataka

## Nikita Kankanawadi, Manjunath Gowda, KH Nagaraj and Veenita MK

**DOI:** https://www.doi.org/10.33545/2618060X.2025.v8.i7Sc.3326

**Abstract**
Sericulture is a vital agro-based industry that provides livelihood to a large number of rural households, especially in Karnataka. The study was conducted to identify the major constraints faced by farmers in mulberry cultivation and silkworm rearing, as well as to assess the sources of information they rely on for sericulture practices. Data were collected from 30 randomly selected farmers across five villages in Tumakuru and Chikkaballapura districts using structured interviews and questionnaires. The Garret Ranking Technique was employed to prioritize the constraints based on farmers' perceptions. Results revealed that pest and disease incidence were the most significant challenges in both mulberry cultivation and silkworm rearing. In terms of information sources, farmers primarily depended on friends and family, followed by the Department of Sericulture and mass media. The findings emphasize the need for strengthening extension services, promoting cost-effective rearing infrastructure and ensuring timely access to technical guidance to improve sericulture sustainability and farmer profitability.

**Keywords:** Farmers, constraints, mulberry cultivation, silkworm rearing, Garret's formula, information sources

## 1. Introduction

Sericulture involves cultivation of mulberry plants, rearing silkworms and reeling of cocoons to obtain raw silk, which is esteemed as the "Queen of Textiles" due to its elegance. Of these activities, mulberry cultivation and silkworm rearing are taken up by farmers. These serves as way for livelihood to sericulture farmers. However, many farmers face a lot of constraints throughout the year due to various reasons, Sharma and Kapoor (2020) [7]. These constraints can be classified into two categories, constraints during mulberry cultivation and silkworm rearing. Crop loss due to specific diseases are also reported to the tune of 30-40 per cent, Dutta *et al.* (2012) [2], hindering the yield and economic development of farmers. Hence, thorough understanding the factors affecting sustainable sericulture becomes important. Therefore, current survey has been undertaken to know the field level problems witnessed in sericulture. Along with this, the sources of information received by the farmers was also studied to get the areas more familiar to them and to ease the transfer of scientific information.

## 2. Materials and Methods

The current study was carried out during 2024 in Chinnivaranahalli, Tamadihalli, Hiregundgal and Buchanahalli villages of Tumakuru district and Hunasenahalli village of Chikkaballapura district. A total of 30 sericulture farmers were surveyed and studied. The selection of farmers was random to ascertain that both emerging as well as experienced farmers were considered for evaluation, which highlights the constraints faced by new rearers and also the problems which have been persisted as listed by experienced farmers. Personal interview and questionnaire methods were followed to collect data. Garret's Ranking Technique provides the change of orders of constraints and advantages into numerical scores. The prime advantage of this technique over simple frequency distribution is that the constraints are arranged based on their severity from the point of view of respondents Zalkuwi *et al.* (2015) [10]. Hence, the same number of respondents on two or more constraints may have been given different rank. To identify and rank the constraints faced by the farmers Garret's Ranking Technique was used.

**Corresponding Author:**
**Nikita Kankanawadi**
Department of Sericulture, College of Agriculture, University of Agricultural Sciences, Gandhi Krishi Vigyana Kendra, Bengaluru, Karnataka, India

Garret's formula for converting ranks into per cents is given by Percent position = 100 * (Rij - 0.5)/Nj, where, Rij = Ranking given to the ith attribute by the jth individual Nj = Number of attributes ranked by the jth individual. The per cent position of each rank was converted into scores referring to the table given by Garret and Woodworth (1969) [3]. For each factor the scores of individual respondents were added together and divided by the total number of the respondents for whom scores were added. These mean scores for all the factors were arranged in descending order. The ranks were given and the most important factors were identified, Sharma *et al*. (2020) [8].

## 3. Results and Discussion
### 3.1 Constraints faced by farmers in mulberry cultivation
The data obtained reveal that among various problems, infestation of mulberry pests emerged as the most critical with the highest Garret mean score (72.93) (Table 1). Farmers indicated that major infesting pests were leaf roller during rainy season and also mealy bugs, thrips and mites were prominent ones. This indicates the pervasive impact of pests, in turn severely affects crop yield. Followed the pest attack, another major factor, disease incidence in mulberry crop (Garret score: 71.67). Leaf spot, powdery mildew and root rot diseases were on top tier reducing the quality and quantity of foliage. Shortage of leaf ranked third (score: 69.60), highlighting the silkworm rearing dependency on the timely and adequate supply of good quality mulberry leaves. Leaf shortages are often due to poor agronomic practices, climatic variations especially high temperatures of summer or the seasonal constraints, which led to poor quality and reduced quantity of leaf yield, Sharma and Kedar-Nath (2013) [9]

**Table 1:** Constraints faced by farmers in mulberry cultivation

| Sl. No. | Factors | Garret mean score | Rank |
|---|---|---|---|
| 1 | Pests of mulberry plant | 72.93 | I |
| 2 | Diseases of mulberry plant | 71.67 | II |
| 3 | Shortage of leaf | 69.60 | III |
| 4 | High input cost (pesticides, fertilisers etc) | 58.00 | IV |
| 5 | Shortage of labour | 52.00 | V |
| 6 | Adverse climatic conditions | 47.00 | VI |
| 7 | Lack of sufficient subsidies | 40.53 | VII |
| 8 | Trainings, field visits and other exposures | 34.63 | VIII |
| 9 | Proper knowledge on package of practices | 33.83 | IX |
| 10 | Lack of suitable varieties | 18.00 | X |

The high cost of inputs like pesticides and fertilizers ranked fourth with 58.0 score, pointing the economic burden on farmers attempting to manage the pests and maintain soil fertility. Labor shortage, which ranked fifth (score: 52.0), continues to be a significant hurdle. Most of the labour duties are being met by family members both men and women. However, shortage was witnessed especially during peak operations like pruning, leaf harvest and other intercultural operations, making it difficult to maintain the timeliness and consistency in silkworm feeding.

Adverse climatic conditions (Rank VI) such as drought, excessive rainfall, extreme temperatures pose threats to both mulberry plant health and leaf productivity, especially in rainfed regions. Inadequate subsidies (Rank VII) and lack of training facilities (Rank VIII) underscore systemic gaps in institutional support and knowledge dissemination, which limit farmers' ability to adopt improved practices, Seshagiri *et al*. (2019) [6]. Knowledge on package of practices (Rank IX) suggests that awareness among the general farming population about scientific mulberry cultivation and its critical link to successful silkworm rearing remains low, unless trained by institutes or officials. Finally, the lack of suitable varieties was the least ranked constraint ranked 10th which indicating that while improved varieties exist, issues lie more in management, access and support rather than in genetic material alone, Mir (2013) [5].

### 3.2 Constraints faced by farmers in silkworm rearing and marketing
The results on analysis of the challenges encountered in silkworm rearing and marketing reveal that disease outbreaks stand as the foremost obstacle, receiving the highest Garret mean score of 76.80 (Table 1). Diseases such as grasserie, flacherie and muscardine often spread rapidly under improper conditions, causing significant larval mortality and leading to substantial economic loss for farmers. Pebrine, though devastating one, not encountered in recent years by the farmers. Closely following this, pest infestation, particularly uzi fly menace, was ranked second (mean score: 75.2). This endo-larval parasite attacks late age worms, resulting in 10-15% damage in silkworm crop.

The third most vital factor was poor mulberry leaf quality (score: 63.0). Diseased, pest infested, soiled, dusty leaf, environmental stress and improper harvest directly influences silkworm nutrition and cocoon quality. Fluctuations in temperature and humidity in rearing house were ranked fourth (mean score: 54.6), highlighting the sensitivity of silkworms to climatic changes. Training on scientific measures to maintain optimum rearing conditions especially in summer and winter need to be given to overcome this. High costs associated with the construction of rearing houses and procurement of rearing equipment ranked fifth (score: 53.83). This is a particular concern for small-scale farmers who lack the capital to invest in ideal rearing infrastructure.

**Table 2:** Constraints faced by farmers in silkworm rearing and marketing

| Sl. No. | Factors | Garret mean score | Rank |
|---|---|---|---|
| 1 | Silkworm diseases | 76.80 | I |
| 2 | Pests of silkworms (insect and non-insect) | 75.20 | II |
| 3 | Poor quality of mulberry leaf | 63.00 | III |
| 4 | Maintaining optimum temperature and humidity | 54.60 | IV |
| 5 | Cost of construction, equipment etc | 53.83 | V |
| 6 | Lack of suitable silkworm breeds/hybrids | 43.33 | VI |
| 7 | Shortage of labour | 42.17 | VII |
| 8 | Marketing and price fluctuation | 41.67 | VIII |
| 9 | Disinfection and hygiene | 30.00 | IX |
| 10 | Supply of healthy disease free layings (dfls) | 18.00 | X |

In the sixth position was the evolution of news silkworm breeds/hybrids which can tolerate all seasonal variations (score: 43.33). Summer crop rearing usually fetch low market value due to high temperature and loss of cocoon quality. Therefore, seasons specific or all year-round breeds and hybrids need to be provided for rearing. Labor shortage was identified as the seventh constraint (score: 42.17), posing problems during leaf feeding, bed cleaning, mounting and cocoon harvest. Unstable cocoon prices, ranked eighth (score: 41.67), add to farmers' financial uncertainty. Price fluctuations depend on instability in demand, involvement of middlemen and poor cocoon crop. Without assured returns, many farmers hesitate to scale up production.

Improper disinfection practices were placed at ninth (score: 30.0), reflecting gaps in hygiene management that increase the risk of disease outbreaks across successive crops. Interestingly, non-availability of healthy disease-free layings (dfls) was found to be the least significant issue (ranked tenth; score: 18.0), suggesting that recent improvements in seed supply systems and government-supported centres (Chawki Rearing Centres) have largely addressed this challenge.

Overall, to ensure sustainable sericulture, there is a pressing need for an integrated strategy that addresses both mulberry cultivation and silkworm rearing challenges. Key priorities include effective pest and disease control, affordable infrastructure and equipment like trays, stands, leaf preservation chamber etc, consistent farmer training and supportive policies to stabilize cocoon pricing. Strengthening these areas will boost productivity, profitability and farmer confidence across the sericulture value chain.

## 3.3 Sources of information for farmers regarding various sericulture activities

The analysis of information sources used by farmers for sericulture-related activities reveal that friends and family are the most relied-upon source for farmers (Garret score 78) (Table 3) ranking first. Department of Sericulture (DoS) was ranked second (score: 59.67), indicating its significant role in providing technical support, training and updates on government schemes. However, its reach and regular engagement still lag behind informal channels. Television, with a score of 57.33, ranked third, suggesting that visual media continues to be a widely used tool for disseminating agricultural information. This is likely due to its convenience and the availability of regional language content.

**Table 3:** Sources of information for farmers regarding various sericulture activities

| Sl. No. | Factors | Garret mean score | Rank |
|---------|---------|-------------------|------|
| 1 | Friends and family | 78.00 | I |
| 2 | Department of Sericulture | 59.67 | II |
| 3 | Television | 57.33 | III |
| 4 | Apps/ social media | 55.00 | IV |
| 5 | Magazine | 43.00 | V |
| 6 | Newspaper | 35.00 | VI |
| 7 | Others | 22.00 | VII |

Mobile apps and social media platforms, ranked fourth (score: 55.0) are emerging as important tools, especially among younger farmers. Their growing popularity highlights the shift towards digital knowledge sharing, although limited internet access in rural areas may restrict their full potential, Illahi *et al.* (2020) [4]. Magazines and newspapers were ranked fifth and sixth, respectively, indicating moderate levels of trust and usage among farmers. These print media sources are generally used for broader updates rather than real-time problem- solving. The lowest-ranked category (score: 22, rank VII) likely includes non-traditional or less structured sources such as private input dealers, NGOs, neighbouring village farmers or local progressive farmers. In summary, the results

## 4. Conclusion
The constraints faced by sericulture farmers during mulberry cultivation and silkworm rearing revealed emerging as critical challenges. Pest and disease outbreaks were the major hurdles. Additionally, information flow remains largely dependent on informal sources like friends and family, underscoring the need to strengthen formal extension systems. An integrated approach involving improved pest and disease management, targeted training, infrastructure support and enhanced information dissemination is essential to ensure sustainable and profitable sericulture.

## 5. References
1. Dar HU, Farhat IQS, Munshi NA, Tantray AM, Shiekh ND. Constraints of silkworm rearers in Kashmir valley for adoption of rearing technologies. Indian J Seric. 2009;48(1):96-9.
2. Dutta S, Roy GC, Samanta A, Senapati AK, Ghosh SK, Majumdar MK, *et al*. Integrated management of diseases and pests of silkworm. J Environ Sociobiol. 2012;9(2):191-6.
3. Garret HE, Woodworth RS. Statistics in Psychology and Education. Bombay: Vakils, Feffer and Simons Pvt. Ltd.; 1969. p. 329.
4. Illahi I, Gull A, Sharma SP. Yield gap analysis of cocoon productivity in four sericlusters of Jammu and Kashmir. Indian Hortic J. 2016;6:60-3.
5. Mir MA. Studies on the impact of adoption of sericulture technologies on cocoon production and productivity in Kashmir [PhD thesis]. Kashmir: Sher-e-Kashmir University of Agricultural Sciences & Technology; 2013. p. 26-53.
6. Seshagiri SV, Raju PJ. Awareness through training programs among sericulture entrepreneurs of weaker sections: A study in Anantapur district of Andhra Pradesh. J Agric Ext Manag. 2019;20(1):139-53.
7. Sharma K, Kapoor B. Sericulture as a profit-based industry: A review. Indian J Pure Appl Biosci. 2020;8(4):550-62.
8. Sharma M, Suryavanshi P, Singh Y. Garret's ranking analysis of constraints influencing off season vegetable growers in District Mohali. J Pharmacogn Phytochem. 2020;9(2):46-9.
9. Sharma ML, Kedar-Nath Y. Constraints in adoption of recommended sericulture production technology in Korba district of Chhattisgarh. Agric Update. 2013;8(3):357-63.
10. Zalkuwi J, Singh R, Bhattarai M, Singh OP, Dayakar Rao. Analysis of constraints influencing sorghum farmers using Garret's ranking technique: A comparative study of India and Nigeria. Int J Sci Res Manag. 2015;3(3):2435-40.