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An Economic Analysis of Area and Production of Sericulture Cultivation in Ramanagara District

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Abstract

This study focuses on Ramanagara district, widely known as the "Silk City" and recognised as one of the most important sericulture regions in India. The district hosts one of Asia's largest cocoon markets, where daily transactions often involve tens of thousands of kilograms of cocoons, attracting farmers from various parts of South India. The study aimed to examine the growth in the area under mulberry cultivation and mulberry silkworm cocoon production in both traditional and non-traditional sericulture areas of Karnataka. The analysis was based on secondary data collected over ten years, from 2014–15 to 2023–24. The results indicate a steady increase in the area under mulberry cultivation, which expanded from 17,200 hectares in 2014–15 to 20,804 hectares in 2023–24. Similarly, cocoon production exhibited an overall upward trend, increasing from 18,340 metric tonnes (MT) in 2014–15 to 21,500 MT in 2023–24.

Furthermore, the analysis revealed a strong and statistically significant positive relationship between the area under mulberry cultivation and silk cocoon production in Ramanagara district ($r = 0.730$, $p = 0.0165$). The findings show that variations in mulberry cultivation area account for 53.3 per cent of the variation in cocoon production. The remaining variation may be attributed to other influencing factors such as climatic conditions, silkworm races, technological interventions, management practices, and market dynamics. Overall, the study confirms that the expansion of mulberry cultivation is a major and systematic driver of cocoon production in the district, highlighting its critical role in the growth and sustainability of the sericulture sector.

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KEYWORDS: Sericulture, Performance, Introduction to Mulberry Cultivation, Silk Cocoon Production, Mulberry Silkworm, and Correlation Analysis.

1. INTRODUCTION

Sericulture is one of the most significant agro-based industries in India, playing a vital role in rural employment generation, income diversification, and export earnings. As a labor-intensive and environmentally friendly activity, sericulture provides sustainable livelihood opportunities, particularly to small and marginal farmers. India ranks among the leading producers of silk globally, with Karnataka emerging as the foremost silk-producing state due to its favorable agro-climatic conditions, institutional support, and long-standing tradition of silk production. Within Karnataka, Ramanagara district occupies a prominent position and is popularly known as the "Silk City" or "Silk Town" of India. The district is a premier sericulture hub, contributing a substantial share of the state's cocoon production and hosting Asia's largest cocoon market. Extensive mulberry cultivation, coupled with the production of high-quality bivoltine and cross-breed cocoons, has made Ramanagara a crucial supplier of raw material for the renowned Mysore silk industry. Sericulture in the district functions as a major agro-based industry, offering year-round employment and income to thousands of rural households, especially small and marginal farmers.

Despite its economic significance, cocoon production in Ramanagara is influenced by multiple factors such as changes in the area under mulberry cultivation, climatic variability, technological adoption, silkworm races, and market fluctuations. Understanding the relationship between mulberry cultivation area and cocoon production is essential for designing effective policies and interventions aimed at enhancing productivity and ensuring the sustainability of sericulture. In this context, the present study examines the growth and performance of mulberry cultivation and silk cocoon production in Ramanagara district, with particular emphasis on analyzing the relationship between cultivated area and production levels.

2. RESEARCH OBJECTIVES

1. To study the role and development of sericulture cultivation in Ramanagara district.
2. To analyze the growth in area under mulberry cultivation and mulberry silkworm cocoon production in the district.

Hypothesis

1. There is a significant positive relationship between the area under mulberry cultivation and cocoon production in Ramanagara district over the study period.

3. METHODOLOGY OF THE STUDY

This study is primarily based on secondary data collected from various sources, including publications and reports of the Government of Karnataka, the Directorate of Economics and Statistics, the Department of Sericulture, and District at a Glance reports. Additional information was obtained from scholarly journals, newspapers, and relevant online sources. The analysis utilizes secondary data covering ten-year period from 2014–15 to 2023–24.

Statistical Technique Analysis: The study employed a combination of descriptive and analytical statistical techniques to examine the growth trends and relationships between the area under mulberry cultivation and cocoon production in Ramanagara district. The primary analytical tools included percentage analysis, Compound Annual Growth Rate (CAGR) to measure annual growth trends, and correlation analysis to assess the relationship between mulberry cultivation area and cocoon production. All statistical analyses were performed using SPSS Version 21 and Gretl software, ensuring accuracy, reliability, and robustness in data analysis and interpretation.

Role of Sericulture Cultivation in Ramanagara District

Sericulture serves as the economic backbone of Ramanagara district, providing year-round income and employment opportunities to thousands of rural households, particularly small and marginal farmers. As a leading agro-based industry, sericulture in the district integrates extensive mulberry cultivation, organized cocoon marketing infrastructure, and a reliable supply of raw materials, thereby playing a vital role in sustaining rural livelihoods and strengthening Karnataka's silk economy. The district hosts a major Cocoon Market in Ramanagara, with widespread cultivation across Taluks like Kanakapura, Channapatna, and Magadi.

Ramanagara district, popularly known as the "Silk City" or "Silk Town," is a premier sericulture hub in India, contributing more than 22% of Karnataka's total cocoon production. The district accounts for over 20,800 hectares under mulberry cultivation and is home to Asia's largest cocoon market. Ramanagara is renowned for the production of high-quality bivoltine and cross-breed cocoons, which form the backbone of the prestigious Mysore silk industry. It produces high-quality silk used to make the famous Mysore Silk.

4. RESULTS AND DISCUSSION

Growth of Area and Production of Sericulture Cultivation in Ramanagara District

Karnataka produces nearly 45% of the country's mulberry silk. Silk cities: Mysore and North Bangalore are known as the 'Silk City' and contribute to a majority of the state's silk production. The Ramanagara district in Karnataka is the largest market for silk cocoons in Asia. Ramanagara district is a top sericulture hub in Karnataka, with over 20,800 hectares of mulberry cultivation and significant cocoon production. During 2020-21, the district produced 19,662 tons of cocoons with a productivity of 89kg/100 DFLS, ranking third in the state. Kanakapura, Channapatna, Ramanagara, and Magadi are the primary taluks, with a major focus in Kanakapura (9,528 ha) and Channapatna (3,609 ha). The district supports over 26,012 sericulturists across 1,148 villages. It features Asia's largest cocoon market, enhancing commercial activity.

In 2015, the average yield was roughly 65 kg per 100 DFLs (Disease-Free Layings). By 2024, this has improved to 90–95 kg, meaning farmers are producing more silk from the same number of silkworms. The number of active reeler units dropped from roughly 3,200 to 1,019, largely due to high labor

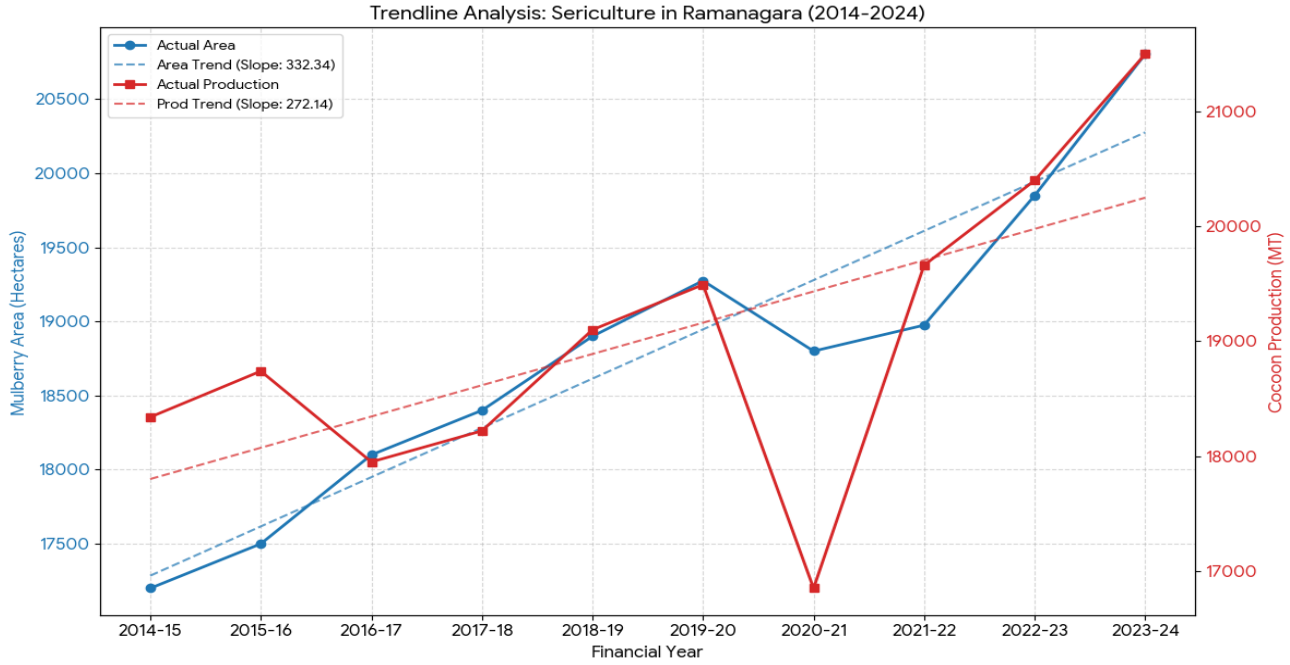
costs and the younger generation moving to Bengaluru for service-sector jobs. Cocoon prices hit a record high in 2024, reaching Rs.700–800/kg for high-quality Bivoltine, compared to just Rs.350–400 in 2015.

Table 1 Growth of Area and Production of Sericulture Cultivation in Ramanagara District from 2014 to 2023

Year	Mulberry Area (Hectares)	Cocoon Production (MT)
2014-15	17,200	18,340
2015-16	17,500	18,740
2016-17	18,100	17,950
2017-18	18,400	18,220
2018-19	18,900	19,100
2019-20	19,275	19,493
2020-21	18,800	16,850
2021-22	18,975	19,662
2022-23	19,850	20,400
2023-24	20,804	21,500

Source: Various Reports of Sericulture Department and Directorate of Economics and Statistics – 2014 to 2023.

The table presents data on the area under mulberry cultivation (in hectares) and cocoon production (in metric tonnes) over ten years. Overall, the mulberry cultivation area shows a steady increasing trend, rising from 17,200 hectares in 2014–15 to 20,804 hectares in 2023–24. Similarly, cocoon production generally, increases over the period, growing from 18,340 MT in 2014–15 to 21,500 MT in 2023–24. This suggests improvements in productivity, better silkworm rearing practices, and enhanced mulberry yield.



As per the graph, the trendline analysis for the sericulture data in Ramanagara district from 2014-15 to 2023-24 indicates a robust and positive growth trajectory for both the cultivation area and output.

Table- 2 Summary of Trend Statistics

Metric	Average Annual Growth (Slope)	2014-15	2023-24	Total % Growth
Mulberry Area (Hectares)	+332.34	17,200	20,804	**20.9%**
Cocoon Production (MTs)	+272.14	18,340	21,500	**17.2%**

1. Mulberry Area Trend: The area under mulberry cultivation shows a strong and consistent upward linear trend.
Regression Equation: Area = 332.34 x Year + 17284.87
On average, the area has expanded by approximately 332 hectares per year. Despite a slight contraction during the 2020-21 pandemic year (likely due to labor and movement

restrictions), the recovery was rapid, reaching a decade-high of 20,804 hectares in 2023-24.

2. Cocoon Production Trend: Cocoon production also follows a positive trend, though it exhibits higher volatility compared to the area. Regression Equation: Production = 272.14 x Year + 17800.87. The production grows at an average rate of approximately 272 (MTs) per year. The sharpest dip occurred in 2020-21 (falling to 16,850 MTs), which was a significant outlier caused by the global pandemic disrupting the supply chain and market arrivals. The 2016-17 dip (17,950 MTs) correlates with regional drought conditions that affected mulberry foliage quality. By 2023-24, production is projected to hit a peak of 21,500 MTs, demonstrating high resilience.

Testing Hypothesis

H0: There is no significant positive relationship between the area under mulberry cultivation and cocoon production in Ramanagara district over the study period.

H1: There is a significant positive relationship between the area under mulberry cultivation and cocoon production in Ramanagara district over the study period.

Table: 3 Correlation Result for Mulberry Area and Cocoon Production in Ramanagara District of Karnataka

S. No	Statistical Metric	Value	Interpretation
1	Pearson Correlation (r)	0.730	Strong Positive Correlation
2	Coefficient of Determination (R^2)	0.533	Moderate-High Explanatory Power
3	P-Value	0.0165	Statistically Significant ($p < 0.05$)
4	Sample Size (n)	10 Years	Decade-long observation period

The strength of the relationship, as indicated by a correlation coefficient (r = 0.730), reveals a strong positive linear association between the area under mulberry cultivation and silk cocoon production. This suggests that increases in mulberry cultivation area in Ramanagara district are generally accompanied by corresponding increases in cocoon output. An R^2 value of 0.533 indicates that 53.3% of the variation in cocoon production is explained by changes in the area under mulberry cultivation. The remaining 46.7% of the variation can be attributed to other influential factors, including climatic conditions and rainfall variability, silkworm race, technological interventions, and market-related shocks.

The relationship is statistically significant (p = 0.0165). Since the p-value is lower than the conventional significance level of 0.05, the null hypothesis is rejected. This result confirms that the observed association between the area under mulberry cultivation and cocoon production is not due to random variation, but instead reflects a genuine and systematic agricultural trend in the district.

5. CONCLUSION

In conclusion, the study highlights the critical role of sericulture in the agricultural and economic landscape of Ramanagara district, Karnataka. The findings reveal a strong, positive, and statistically significant relationship between the area under mulberry cultivation and silk cocoon production, confirming that expansion in mulberry acreage is a key driver of increased cocoon output in the district. The correlation and regression results indicate that more than half of the variation in cocoon production is explained by changes in the cultivated area, underscoring the importance of land allocation to mulberry farming. The correlation results prove that the district's silk economy is still heavily driven by area expansion. However, because nearly half of the production variance (46.7%) is due to factors other than land size, the data suggest that Ramanagara is in a transition phase where yield efficiency (output per hectare) and modern rearing technology are becoming just as important as the physical land area for future growth.

However, the study also finds that a substantial proportion of variation in cocoon production is influenced by other factors such as climatic conditions, silkworm races, technological interventions, and market dynamics. This suggests that while area expansion is important, productivity enhancement through improved technology, climate-resilient practices, and efficient market support systems is equally essential. Overall, the results emphasize the need for integrated policy measures that promote sustainable mulberry cultivation, technological adoption, and institutional support to strengthen sericulture-based livelihoods and ensure the long-term growth of the silk industry in Ramanagara district.

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