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Sericulture in Kashmir Present Status Structural Challenges and Pathways to Sustainable Rural Livelihoods

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Abstract

Sericulture remains an important livelihood option in the Union Territory of Jammu and Kashmir (J&K), where limited agricultural opportunities and fragmented landholdings shape rural economies. This study examines the present status of the sector, with a focus on its structural constraints and potential pathways for sustainable rural livelihoods. The analysis draws on district-level secondary administrative data obtained through Right to Information Act 2009 (RTI), complemented by the Economic Survey 2024–25, Central Silk Board reports, and relevant scholarly literature. Despite recent policy-led growth in cocoon production, the extent to which this growth has translated into structural transformation of the sericulture value chain, enhanced value addition, and inclusive rural livelihoods remains insufficiently examined. The findings indicate a mixed trajectory. Cocoon production increased by 17.6%, rising from 6.99 lakh kg in 2022–23 to 8.22 lakh kg in 2023–24, reflecting renewed growth in primary production. However, this progress is constrained by persistent gaps in post-cocoon processing and value addition. Nearly 60% of cocoon output is exported outside the region, leading to an estimated annual loss of over ₹20 crore in potential value. While women constitute more than 53% of the workforce, their participation in formal economic activities remains limited. The study therefore evaluates whether production gains have resulted in structural transformation and inclusive livelihood outcomes across districts.

1. Introduction

The Union Territory of Jammu and Kashmir (J&K) presents a distinctive developmental context in which ecological constraints, socioeconomic vulnerabilities, and agro-based opportunities intersect to shape rural livelihoods. Its Himalayan geography—characterized by complex topography, a limited agricultural window, and climatic extremities—has historically restricted the expansion of conventional agriculture and imposed structural limitations on income generation. The territory's cultivable land, estimated at approximately 1,094 thousand hectares or roughly 35% of total area (Government of India, 2023), is fragmented, sloped, and prone to degradation. At the same time, agriculture's contribution to J&K's GDP has declined sharply by approximately 20% in the financial year 2023–24 (Akmali, 2024b), signalling a broader structural transition with significant implications for nearly 70% of the population dependent on primary-sector livelihoods (Planning Commission of India, 2013). Within this context of agrarian stress and economic transition, the diversification of rural livelihoods assumes critical importance. Among the available alternatives, sericulture—encompassing mulberry cultivation, silkworm rearing, cocoon production, and silk processing—emerges as a strategically significant agro-based activity. Its compatibility with the region's agrarian calendar, low capital requirements, and suitability for marginal landholdings make it particularly relevant in the context of smallholder economies (Ganie et al., 2018). Moreover, its social embeddedness is notable: sericulture is predominantly practiced by women, small and marginal farmers, Scheduled Castes, and Scheduled Tribes, positioning it as an inherently inclusive livelihood system (Thiagarajan & Venkatesan, 2013). These characteristics elevate sericulture beyond a supplementary occupation, situating it as a potential driver of equitable rural development.

Ecologically, Kashmir possesses a distinct comparative advantage in sericulture production. Its temperate climate and altitude closely resemble those of leading bivoltine sericulture regions in China and Japan, enabling the production of superior-quality silk that commands premium value in international markets (Kamili et al., 2005). At the national level, India's sericulture sector further underscores this strategic importance. The country is the world's second-largest producer of raw silk after China and the largest consumer of silk textiles, contributing approximately 15.75% of global raw silk production (Giridhar et al., 2010; Central Silk Board, 2024). India's unique capacity to produce all four commercially significant silk varieties—Mulberry, Tasar, Eri, and Muga—across diverse agro-climatic regions reinforces its global position (Dandin et al., 2003). Within this broader framework, J&K occupies a specialized niche as the country's exclusive producer of international-grade bivoltine silk, making it a critical node in both domestic and global silk value chains (Bhat et al., 2024).

Despite these ecological advantages and institutional support mechanisms, the sericulture sector in J&K has historically underperformed relative to its potential. Prolonged political instability, infrastructural inadequacies, limited private investment, and weak market linkages have collectively constrained its growth trajectory (Gul & Gulzar, 2023). The reorganization of J&K as a Union Territory in 2019 introduced a renewed policy thrust, with targeted interventions such as Silk Samagra-2 and the Holistic Agriculture Development Programme (HADP) contributing to a measurable revival in cocoon production. However, this revival remains uneven and structurally incomplete. Persistent imbalances between production and processing, deficiencies in data governance, and the limited integration of women into formal economic structures continue to restrict the sector's transformative potential. However, a critical analytical gap persists: while recent policy interventions have stimulated production growth, there is limited empirical evidence on whether these gains have translated into structural transformation of the sericulture value chain, particularly in terms of value addition, gender inclusion, and regional equity. This study addresses this gap through a systematic, evidence-based assessment of Kashmir's sericulture sector. Drawing on secondary administrative data obtained through RTI Application No. PEO/RTI/2025-26/892 – 95, and complemented by the Economic Survey 2024–25, Central Silk Board publications, and peer-reviewed literature, the study examines district-level variations in production, infrastructure, and participation. The central research question guiding this inquiry is whether recent policy-driven gains in cocoon production have resulted in sustainable and inclusive rural livelihoods. Accordingly, the study seeks to: (i) document the current production status and economic performance of sericulture across twelve districts in Kashmir; (ii) evaluate the effectiveness and limitations of major policy interventions; (iii) analyse women's participation and the gender dimensions of value-chain integration; (iv) assess environmental pressures on the mulberry resource base; and (v) identify evidence-based pathways for sustainable and inclusive sectoral development aligned with the Sustainable Development Goals.

2. Literature Review

The existing body of literature on sericulture spans themes of rural livelihood sustainability, policy interventions, value chain development, and gender participation. While these studies provide important insights into the economic and social significance of sericulture, they remain fragmented in their

treatment of regional dynamics, particularly in the context of Jammu and Kashmir. Moreover, limited attention has been paid to the relationship between recent production gains and structural transformation of the sericulture value chain. This section critically reviews the relevant literature to situate the present study within these thematic and empirical gaps.

2.1 Sericulture as a Sustainable Rural Livelihood System

The body of literature on sericulture as a livelihood strategy consistently emphasizes its alignment with sustainable development principles. Thiagarajan and Venkatesan (2013) demonstrate that sericulture generates a higher employment-to-capital ratio than most comparable agro-industries in developing Asia, making it particularly effective at addressing rural underemployment. Savithri et al. (2012) document its capacity for inclusive growth, noting that, unlike many industrial activities, sericulture can be practiced by the elderly, women, and those with limited formal education, thereby reaching households excluded from mainstream economic participation. Dun and Bradstreet (2009) identify silk as a high-value commodity whose production chain—from mulberry leaf to woven fabric creates employment at each stage, enabling rural economies to capture value across an extended supply chain. The environmental sustainability of sericulture has received growing attention in the context of climate adaptation. Islam et al. (2015) highlight that mulberry cultivation improves soil health, reduces erosion on sloped terrain, and sequesters carbon at rates comparable to agroforestry systems, giving it a dual function as both a productive crop and an ecological management tool. This is particularly significant in a region like Kashmir, where land degradation and soil erosion on mountain slopes represent persistent threats to agricultural productivity (Romshoo et al., 2015). Koul et al. (2022) further argue that sericulture's low water footprint and chemical input requirements make it a climate-compatible livelihood option in increasingly resource-constrained mountain environments. While these studies establish sericulture as a viable and sustainable livelihood system, they do not adequately address regional disparities and structural constraints in specific contexts such as Jammu and Kashmir.

2.2 Sericulture in India and Jammu & Kashmir: Historical and Policy Context

India's sericulture sector has been extensively studied from historical, economic, and policy perspectives. Dandin et al. (2003) provide a comprehensive overview of the industry's development, tracing its expansion from a geographically concentrated craft in Karnataka and Tamil Nadu to a nationally dispersed industry encompassing diverse silk varieties and ecologies. The authors note that although Karnataka consistently leads in output, the geographic diffusion of sericulture has been a deliberate policy outcome, driven by the Central Silk Board's mandate to promote rural employment across ecologically suitable regions. For Jammu and Kashmir specifically, Kamili et al. (2005) identify the region's unique potential in bivoltine silk culture, attributing it to altitude-induced temperature moderation, low humidity variability, and the quality of mulberry leaf produced in the valley. Gul and Gulzar (2023) examine the historical decline of the silk industry in Kashmir, identifying inter-linked causes including prolonged political conflict, outmigration of skilled artisans, collapse of traditional

weaving clusters, and the erosion of institutional support for the sector during periods of instability. Mir et al. (2014) extend this analysis, documenting how sericulture's share in J&K's rural economy contracted through the 1990s and 2000s and arguing that structural revitalization requires concurrent investment in primary production, processing infrastructure, and market linkages. Bhat et al. (2024) provide a comprehensive contemporary review of sericulture in J&K, situating the sector's trajectory within the broader context of agricultural transformation under the Union Territory framework, noting that while centrally sponsored schemes have succeeded in stimulating primary production, the absence of equivalent investment in reeling and weaving infrastructure creates a persistent structural bottleneck. Ahmad et al. (2021) specifically evaluate the impact of government training programmes on sericulture productivity in J&K, finding significant positive effects on cocoon yield and disease management outcomes among trained farmers, while noting that coverage remains insufficient relative to the sector's potential scale. Although these policy-oriented studies highlight both the potential and constraints of sericulture in J&K, they largely focus on production dynamics and provide limited analysis of value-chain integration and post-production challenges.

2.3 Gender, Value Chains, and Women's Empowerment

The gendered dimensions of sericulture have been documented across South and Southeast Asian contexts. Kaur (2016) argues that sericulture represents one of the most significant formal employment pathways for rural women in India, given that the majority of rearing, leaf harvesting, and cocoon sorting activities are home-based and compatible with domestic responsibilities. Gangopadhyay (2009) estimates that women account for more than 53% of the sericulture workforce nationally, with the proportion significantly higher in states like J&K and West Bengal, where household-based rearing models predominate. However, women's high participation in labour does not automatically translate into economic empowerment: Choudhury and Bhattacharya (2015) document persistent gender gaps in access to credit, land ownership, and decision-making authority within sericulture households, observing that women frequently contribute the bulk of labour while men control financial proceeds. Rao (2017) identifies three structural barriers to women's fuller economic integration in sericulture: limited access to extension services (which predominantly reach male household heads), exclusion from formal market transactions, and insufficient design of government schemes to address women's specific constraints. These findings underscore the importance of gender inclusion in sericulture but also reveal a persistent gap between participation and economic empowerment, a dimension that requires further empirical investigation at the regional level.

3. Study Area

The present study focuses on the Kashmir Valley in the Union Territory of Jammu and Kashmir (J&K), India. The region is situated between the Greater Himalayas and the Pir Panjal range, with an average elevation of approximately 1500–1800 meters above sea level. It experiences a temperate climate marked by cold winters and moderate summers, which is particularly suitable for bivoltine sericulture. The study covers twelve districts, including Baramulla, Kupwara, Budgam, Bandipora, Ganderbal,

Srinagar, Pulwama, Shopian, Kulgam, and Sonawari (ISDP), along with the Basic Seed Station Mirgund. These districts represent varying levels of sericulture development, infrastructure availability, and institutional support. Given the region's fragmented landholdings, limited industrial base, and seasonal agricultural activity, sericulture plays an important supplementary role in rural livelihoods. Mulberry cultivation forms the ecological foundation of the sector, although its distribution and maintenance vary across districts.

4. Methodology

The methodological design of this study follows a structured multi-stage workflow integrating data acquisition, validation, analysis, and interpretation. All datasets used in this study are secondary in nature, including RTI-based administrative records, which are treated as official secondary data rather than primary field data. The methodological workflow (Fig. 1) illustrates a five-stage research process. In Stage 1, district-level administrative data were collected through RTI applications. Stage 2 involved cross-verification of these datasets with secondary sources such as the Economic Survey and Central Silk Board reports to ensure reliability. In Stage 3, the data were classified and aggregated at the district level for comparative analysis. Stage 4 applied analytical tools including descriptive statistics, trend analysis, and value chain analysis. Finally, Stage 5 involved interpretation of findings within a policy and sustainability framework to derive evidence-based recommendations.

4.1 Research Design

This study adopts a convergent mixed-methods design, combining quantitative analysis of district-level production and economic data with qualitative assessment of policy frameworks, institutional capacity, and governance structures. The mixed-methods approach enables triangulation across multiple data sources, strengthening the validity and interpretive depth of the findings (Sharma et al., 2019; Koul et al., 2022).

4.2 Secondary Administrative Data (RTI-Based)

The study utilizes secondary administrative data obtained through RTI applications, rather than primary field-generated data. These data were collected from District Sericulture Offices (DSOs) across twelve districts in the Kashmir Valley and include information on production, revenue, workforce participation, plantation area, and institutional support.

4.3 Secondary Data Sources

To complement the RTI-based administrative data, secondary sources were consulted, including: (i) the Economic Survey 2024–25; (ii) Central Silk Board reports and technical bulletins; (iii) Press Information Bureau releases; (iv) policy documents related to Silk Samagra-2 and HADP; and (v) peer-reviewed scholarly literature. These sources were used to contextualize empirical findings within broader policy and sectoral developments.

4.4 Analytical Framework

The study employs a combination of descriptive statistical analysis, trend analysis, and value chain analysis to examine the structure and performance of the sericulture sector. Descriptive statistics are used to summarise district-level variations in production, workforce participation, and infrastructure distribution. Trend analysis is applied to time-series data to identify growth patterns and fluctuations in cocoon production and revenue. A value chain analytical framework (Kaplinsky & Morris, 2001) is used to assess structural linkages between upstream (mulberry cultivation and silkworm rearing), midstream (cocoon procurement and storage), and downstream (reeling, weaving, and marketing) segments. This approach enables identification of bottlenecks, particularly in post-cocoon processing and value addition. In addition, comparative analysis is employed to examine inter-district disparities, while qualitative interpretation of policy interventions is used to evaluate their effectiveness and limitations. Data gaps, including 'NIL' and 'N/A' entries in RTI responses, are systematically analysed as indicators of data governance constraints rather than treated as missing information. The analytical approaches outlined above form the basis for the results and discussion presented in the following section, enabling a structured interpretation of production trends, institutional gaps, and value chain dynamics.

Figure 1. Methodological workflow of the study illustrating integration of RTI-based administrative data and secondary sources, followed by data processing, classification, analytical framework application, and interpretation leading to policy evaluation and recommendations

5. Results and Discussion

The results are interpreted using a combination of descriptive statistical analysis, inter-district comparative analysis, and value chain analysis. Descriptive statistics are used to identify production trends and distribution patterns, while comparative analysis highlights regional disparities. Value chain analysis is applied to identify structural bottlenecks between production and post-cocoon processing stages.

5.1 The Macro-Level Trajectory: Revival Amid Structural Constraint

The sericulture sector in J&K is currently navigating a critical juncture defined by simultaneous revival and structural constraint. Official data from the Economic Survey 2024–25 confirm an increase in cocoon output from 6.99 lakh kilograms in 2022–23 to 8.22 lakh kilograms in 2023–24, representing year-on-year growth of 17.6% (Government of India, 2025). This growth trajectory reflects the cumulative effect of deliberate policy investment in production-side infrastructure, scientific input supply, and farmer capacity-building. J&K has consequently consolidated its position as a reliable annual producer of approximately 800 metric tonnes of high-quality bivoltine cocoons, reinforcing its strategic role in the national silk economy (Greater Kashmir, 2025).

However, this productive revival throws into sharper relief the sector’s downstream deficits. With only 26 functional reeling units across the entire UT— 16 in Jammu and 10 in the Kashmir Valley, processing capacity is severely insufficient to absorb the increasing raw material supply. Approximately 60% of J&K’s cocoon output is exported to Karnataka and Tamil Nadu for reeling, twisting, and weaving (Alchempro, 2025), resulting in an estimated annual loss of over ₹20 crore in potential value-added revenue (Akmali, 2024a). The region thus functions as a premium raw material supplier to industrial hubs elsewhere, capturing only a fraction of the economic value its high-quality bivoltine cocoons could generate if processed locally.

Automatic Reeling Machines (ARMs), essential for producing uniform export-quality bivoltine yarn meeting international 2A–3A grade specifications, are priced between ₹39 lakh and ₹85 lakh per unit (Press Information Bureau, 2025). This creates a subsidy asymmetry: production receives strong and accessible state support (90% subsidy for rearing house construction under HADP), while processing receives insufficient and inaccessible financial incentives, perpetuating the region’s underdeveloped downstream industrial ecosystem (Mir et al., 2014).

5.2 Silk Quality: The Bivoltine Advantage and Its Demands

Kashmir's comparative advantage rests on near-exclusive specialization in high-grade bivoltine silk, derived from Bombyx mori hybrids of the CSR races developed by the Central Silk Board (Central Silk Board, 2024). Bivoltine cocoons produced in the UT routinely demonstrate a shell ratio of 23–24% and a raw silk recovery rate of 18–19%, consistently yielding 2A–3A grade filament yarn (Press Information Bureau, 2025). Table 2 presents a systematic comparison of J&K bivoltine silk quality parameters against Karnataka polyvoltine varieties.

Table 1

Press Information Bureau (2025); Dandin et al. (2003); Central Silk Board (2024); Kamili et al. (2005). Note: Quality benchmarks represent typical values from published technical literature; individual cocoon batches may vary.

Quality Parameter	J&K Bivoltine Silk	Karnataka Polyvoltine Silk	Significance for J&K Sector
Shell Ratio	23–24%	18–20%	Higher silk content per cocoon; commands premium market pricing
Raw Silk Recovery	18–19%	14–16%	Greater filament yield; cost-efficiency in industrial reeling
Filament Yarn Grade	2A–3A (export grade)	1A–2A (domestic)	Access to international premium textile market segments
Rearing Cycles/Year	2 (bivoltine)	4–5 (multivoltine)	Seasonal constraint requiring maximum per-cycle productivity
Optimal Rearing Temp.	22–28°C	25–32°C	Climatic suitability of Kashmir Valley; rearing house control required
Cocoon Weight	Heavier shell (superior)	Lighter shell	Better reelability; higher per-unit market value realisation

These quality advantages carry demanding production requirements. Optimal rearing temperatures fall within a narrow range (22–28°C), and deviations of even 2–3°C can substantially reduce cocoon weight, shell ratio, and filament reelability (Dandin et al., 2003). Ahmad et al. (2021) confirm that J&K farmers trained through CSRTI Pampore consistently achieved higher cocoon yields and lower disease mortality than untrained counterparts, highlighting the central role of extension services in actualizing the genetic potential of improved silkworm races.

5.3 Policy Architecture: Silk Samagra-2, HADP, and the Cocoon Bank

The recent production revival is anchored in two flagship policy interventions. Table 3 provides a structured evaluation of the major schemes, their provisions, achievements, and identified gaps.

Table 2
Policy Matrix: Sericulture Schemes in J&K — Provisions, Achievements, and Identified Gaps Source: Government of India (2025); ANI (2023); Press Information Bureau (2025); RTI Application No. PEO/RTI/2025-26/892 – 95.

Policy / Scheme	Key Interventions	Financial Provisions	Outcomes / Achievements	Identified Gaps
Silk Samagra-2	Silkworm seed supply; farmer training; plantation rejuvenation; technical extension services	₹63/plant subsidy (90% sub-scheme); seed distribution; rearing kit supply	17.6% production growth (2022–23 to 2023–24); improved farmer technical capacity	Downstream processing largely excluded from scheme mandate
HADP	Rearing house construction; input kits; disinfectants; CGI roofing; silkworm equipment	90% govt subsidy for rearing house construction; up to ₹1.75 lakh per farmer	Infrastructure expansion in Budgam and Sonawari; women-headed household inclusion	No equivalent subsidy mechanism for reeling or weaving infrastructure
J&K Sericulture Rejuvenation Project	100 new rearing centres; MSP establishment; silkworm seed station modernisation	₹91 crore approved Jan 2023; MSP set at ₹800/kg for dry commercial cocoons	Market price stabilisation pipeline; expanded rearing infrastructure	Processing investment component underfunded relative to primary production support
Cocoon Bank	Stabilise cocoon market prices; enable off-peak licensed procurement from farmers	₹100-lakh revolving fund; administered price procurement mechanism	Reduced seasonal price volatility exposure; partial protection from middlemen	Effectiveness limited by insufficient number of functional reeling units

Silk Samagra-2 operationalizes a comprehensive approach to production-side strengthening through high-quality silkworm seed supply, plantation expansion, and systematic farmer training. Its success has been attributed to efficient administrative coordination and high fund utilization rates (Government of India, 2025). HADP complements this through its 90%-government-funded construction subsidy for purpose-built silkworm rearing houses. The Cocoon Bank, supported by a ₹100-lakh revolving fund, stabilizes the market interface between primary producers and processors, addressing seasonal price volatility that historically exposed farmers to middlemen exploitation (Gul & Gulzar, 2023). The ₹91 crore J&K Sericulture Rejuvenation Project approved in January 2023 provides an MSP of ₹800/kg for dry commercial cocoons (ANI, 2023). Nevertheless, the Cocoon Bank's stabilizing effect is limited by the small number of operational reeling units, creating a situation where upstream market stability is achieved while downstream processing capacity stagnates.

5.4 District-wise Analysis: Spatial Patterns of Development and Disparity

The RTI data reveal a highly heterogeneous sericulture landscape across Kashmir's districts. Table 1 presents a consolidated district-level summary of key indicators for 2024, and Figs. 1 and 5 present the spatial production and infrastructure patterns. Figure 4 presents the spatial distribution of cocoon production across districts, highlighting clear regional disparities, with Kupwara and Pulwama emerging as high-production clusters, while districts such as Kulgam remain structurally underdeveloped.

Table 3
District-wise Present Status of Sericulture in Kashmir (2024–25)Source: Primary data, RTI Application No. PEO/RTI/2025-26/892 – 95, Directorate of Sericulture, J&K (2024–25). N/A = data not reported by the respective district office; BSM = Basic Seed Stati

District / Office	Women Engaged	Cocoon Prod. (MT)	Market Value (₹ Lakhs)	Revenue (₹)	Centres
Baramulla (DSO)	220	47.64	106.47	13,11,026	10
Basic Seed Mirgund	2	1.26	N/A	3,83,880	3
Kupwara (DSO)	213	66.10	159.68	8,62,665	11
Budgam (DSO)	52	17.48	48.46	2,20,127	4
ISDP Sonawari	45	19.48	45.82	N/A	10
Pulwama (DSO)	153	56.62	154.20	7,19,000	13
Srinagar (Seed Mgr.)	N/A	1.90	N/A	N/A	N/A
Bandipora (DSO)	303	33.20	78.45	N/A	8
Srinagar (DSO)	41	11.19	36.90	2,76,891	5
Kulgam (DSO)	82	0.66	4.06	4,19,000	0
Ganderbal (DSO)	77	13.44	40.12	N/A	8
Shopian (DSO)	58	12.28	28.81	1,52,000	6
TOTAL	**1,246**	**281.34**	**702.97**	**43,44,589**	**78**

Figure 5. District-wise Cocoon Production in Kashmir (2024, Metric Tonnes) Source: RTI Application No. PEO/RTI/2025-26/892 – 95.

5.4.1 Kupwara and Pulwama: High-Performance Production Hubs

Kupwara and Pulwama together contributed 122.72 MT of cocoon output in 2024—approximately 43.6% of total reporting district output. Kupwara's 66.10 MT and ₹159.68 lakh market value reflect a sector that has successfully leveraged favourable agro-climatic conditions, institutional support, and expanding

female participation. Women's engagement increased from 75 participants in 2020 to 213 in 2024—a 184% increase—driven by HADP and Silk Samagra outreach. Budget allocations of ₹193.875 lakh for sericulture development in Kupwara represent one of the highest district-level investments in the dataset. Pulwama contributes 56.62 MT supported by 13 sericulture centres—the highest count among reporting districts. This underscores the positive relationship between sericulture centre density, technical support access, and production output, a pattern also observed by Ahmad et al. (2021).

5.4.2 Baramulla: Productive Volatility and Revenue Concentration

Baramulla, with 220 women engaged and cocoon production of 47.64 MT, records a market value of ₹106.47 lakh and revenue of ₹13,11,026. Revenue trends exhibit pronounced year-on-year variability: ₹1.16 crore (2019), rising to ₹6.52 crore (2021), declining to ₹5.54 crore (2022), and recovering to ₹7.96 crore (2023). The 2021 revenue peak can be attributed to heightened domestic demand for silk products during the post-pandemic recovery of India's textile industry (FICCI, 2022) and favourable market pricing for bivoltine cocoons. Export revenue from Baramulla remains NIL across the reporting period, highlighting dependence on domestic buyers and restricted access to premium export pricing.

5.4.3 Bandipora: High Participation, Structural Constraint

Bandipora records the highest female engagement at 303 women in 2024—up from 70 in 2020 (+ 333%)—reflecting significant outreach under IDDP and Silk Samagra. Despite this, structural constraints prevent participation from translating into proportionate economic outcomes. Financial assistance to women entrepreneurs is practically absent, and direct employment data remain unrecorded in official registers. These findings corroborate Rao (2017) and Choudhury and Bhattacharya (2015), who document that high female participation in sericulture labour does not automatically generate economic empowerment in the absence of targeted credit, market access, and enterprise support mechanisms.

5.4.4 Budgam: Steady Growth in a Developing Sector

Budgam presents steady, incremental sector development. Cocoon production increased from 6.06 MT in 2020 to 17.48 MT in 2024—a nearly threefold increase—while revenue grew from ₹1.76 crore (2018) to ₹2.20 crore (2024). Uniquely, Budgam records measurable post-training employment outcomes: 15 and 25 candidates secured employment following training in 2023 and 2024, respectively—a rare instance of outcome tracking in the dataset. The absence of reeling units, however, constrains vertical integration and limits the district's capacity to generate value beyond raw cocoon sales.

5.4.5 Ganderbal: Inconsistent Returns and Institutional Gaps

Ganderbal exhibits stable production against highly inconsistent revenue outcomes. Revenue peaked at ₹73.81 lakh in 2020, plummeted to ₹13.76 lakh in 2023, and recovered partially to ₹41.36 lakh in 2024. Records on women's involvement, plantation expansion, employment, and infrastructure are largely 'N/A',

indicating minimal penetration of formalized institutional support—consistent with Kaplinsky and Morris's (2001) observation that value chain upgrading requires coordinated institutional intervention at multiple nodes simultaneously.

5.4.6 Shopian: Functional but Under-Optimized

Shopian presents a functioning yet under-optimized sector: 58 women engaged, 12.28 MT cocoon production, six sericulture centres. However, a critical gap between market value (₹28.81 lakh) and annual revenue (₹1.52 lakh) indicates farmers are operating almost exclusively as raw cocoon sellers without access to value-added processes. This value-capture deficit is symptomatic of the broader downstream infrastructure shortage affecting the UT.

5.4.7 Kulgam: Institutional Neglect and the Cost of Absent Infrastructure

Kulgam stands as the most structurally neglected case in the dataset. The only available production figure dates to 2014 (0.66 MT) and the district maintains no operational sericulture centres. Without access to improved silkworm breeds, scientific rearing guidance, disease management protocols, or post-cocoon marketing support, the 82 women previously engaged lack the institutional scaffolding necessary to sustain or expand their practice. Revitalization would require, at minimum, an updated baseline assessment, establishment of at least one district sericulture centre, targeted training, and seed supply integration.

5.5 Mulberry Resource Base: Investment, Threats, and Environmental Governance

The mulberry plantation base constitutes the biological foundation of the entire sericulture value chain in J&K. Across reporting districts, government investment has been substantial: Baramulla maintains 108 kanals under cultivation with approximately 45,000 saplings planted annually; Kupwara supports 270 kanals with 50,000 annual saplings; Budgam cultivates 230.10 kanals under the Goshoearmi variety. The Silk Samagra programme provides planting subsidies of ₹7 per plant (or ₹63 per plant under the 90% sub-scheme). Despite this, yield-per-acre data remain unrecorded across most districts—a critical data gap that prevents rigorous assessment of plantation productivity (RTI Application No. PEO/RTI/2025-26/892 – 95, 2025).

The illegal felling of mulberry trees has emerged as an increasingly severe governance challenge with direct economic consequences for sericulture productivity (Gulzar Bhat, 2024). The problem is legally addressed under the Jammu and Kashmir Mulberry Protection Act of 1949. Integration of GIS mapping, geo-tagging of plantation parcels, and remote-sensing surveillance would substantially strengthen the accountability framework (Romshoo et al., 2015). Islam et al. (2015) note that strategic expansion of mulberry cultivation on degraded hillside terrain could simultaneously serve sericulture productivity goals and ecosystem restoration objectives.

5.6 Women's Participation: From Labour Force to Economic Agency

Women constitute the dominant labour force in Kashmir's sericulture sector, accounting for over 53% of the workforce nationally (Gangopadhyay, 2009). Across the twelve reporting districts, 1,246 women were engaged in sericulture activities in 2024. Table 4 presents longitudinal trends in female engagement, and Fig. 2 illustrates the relationship between women's engagement and market value realization.

Table 4
Longitudinal Trends in Women's Engagement in Sericulture by District (2020–2024)
Source: RTI Application No. PEO/RTI/2025-26/892 – 95, Directorate of Sericulture, J&K.
Note: Sonawari 2020 figure is approximate due to partial reporting. Data for districts

District	2020	2021	2022	2023	2024	% Change 2020–2024
Kupwara	75	92	130	185	213	+ 184%
Bandipora	70	110	180	250	303	+ 333%
Budgam	30	35	40	48	52	+ 73%
Sonawari (ISDP)	~ 5	12	25	38	45	+ 800%
Shopian	58	58	58	58	58	0%

Across most reporting districts, specialized financial assistance for women entrepreneurs is absent; post-training placement data are recorded as NIL; and market value realization from women-dominated rearing operations accrues disproportionately to male intermediaries who control cocoon transactions and marketing channels (Choudhury & Bhattacharya, 2015). Kaur (2016) argues that transforming women's sericulture labour into genuine economic agency requires three simultaneous interventions: credit access specifically designed for women entrepreneurs; women-controlled market linkages that bypass male-dominated intermediary chains; and extension services that reach women directly rather than through male household heads. The current policy architecture in J&K addresses none of these three requirements systematically.

5.7 Employment, Skills, and Data Governance

Employment generation represents one of sericulture's most cited development benefits, yet systematic data on labour absorption remain deeply fragmented. Allied activities—equipment manufacturing, marketing, transport, and input supply—employ approximately 1,400 individuals across reporting districts, while government-supported plantation and shed development schemes have created additional employment for 386 individuals. Kupwara's direct employment of 1,511 workers in 2024 represents the strongest documented case of sericulture's labour-absorbing capacity in the dataset. The near-universal absence of post-training placement and income outcome data prevents rigorous evaluation of training effectiveness—a gap Ahmad et al. (2021) identify as a systemic weakness in J&K's agricultural extension architecture. Budgetary transparency represents another significant governance

failure; budget allocations are recorded as 'NA' in multiple districts, restricting informed policy analysis and preventing accountability for public investment outcomes.

6. Discussion: Pathways to Sustainable and Inclusive Growth

Based on the empirical analysis presented above, five strategic pathways emerge as priorities for transforming Kashmir's sericulture sector. Table 5 provides a structured summary of recommended interventions, implementation actors, and SDG alignments.

Table 5
Strategic Recommendations for Sustainable Sericulture Development in J&K Source: Authors' synthesis based on RTI Application No. PEO/RTI/2025-26/892 – 95; Government of India (2025); ANI (2023); Singh et al. (2020); Kaplinsky and Morris (2001).

Strategic Priority	Recommended Interventions	Implementation Actors	SDG Alignment	Priority Level
Processing Infrastructure	Expand ARM subsidy framework with simplified credit; establish PPP reeling units in Kupwara and Pulwama; develop integrated weaving clusters	DoS; Central Silk Board; J&K Industries Dept.; Private sector partners	SDG 8, SDG 1	Critical
Digital Plantation Governance	GIS mapping of all mulberry parcels; geo-tagging of individual trees; remote-sensing surveillance; integration with Mulberry Protection Act	DoS; J&K Remote Sensing Agency; Forest Dept.; Revenue Dept.	SDG 13, SDG 15	High
Women's Empowerment	Dedicated credit products for women entrepreneurs; women-controlled marketing cooperatives and SHGs; extension services delivered directly to women	DoS; NABARD; Microfinance institutions; SHG networks	SDG 5, SDG 1, SDG 8	High
Data Governance Reform	Standardised DSO reporting protocols; digital data collection systems; independent verification; publicly accessible data portals	DoS; Directorate of Economics & Statistics; NIC; independent auditors	SDG 16, SDG 17	High
Market Diversification	Quality certification for J&K bivoltine silk; GI tag development; international silk trade fair participation; export facilitation infrastructure	DoS; APEDA; Central Silk Board; J&K Trade Promotion Organisation	SDG 8, SDG 10	Medium

6.1 Resolving the Processing Infrastructure Bottleneck

The most urgent structural reform required is the expansion of reeling and post-cocoon processing capacity. The current inventory of 26 functional reeling units is wholly inadequate to absorb the UT's growing cocoon output. Addressing this bottleneck requires: expanding the ARM subsidy framework with simplified credit mechanisms specifically designed for entrepreneurs in J&K's constrained financing environment; establishing public-private partnership models for industrial reeling units in Kupwara and Pulwama; and developing weaving clusters linked to reeling units to enable full value-chain integration from cocoon to fabric within the UT. The ₹91 crore J&K Sericulture Rejuvenation Project (ANI, 2023) provides an important financial foundation, but equivalent capital commitment to downstream processing is needed to correct the subsidy asymmetry that has characterized J&K's sericulture policy for decades.

6.2 Digital Governance of the Mulberry Resource Base

Protecting the mulberry resource base requires a transition from reactive enforcement to proactive digital governance. GIS-based mapping of all mulberry plantation parcels, combined with geo-tagging of individual trees and regular remote-sensing surveillance, would enable real-time detection of illegal removal and systematic monitoring of plantation health. Romshoo et al. (2015) demonstrate the feasibility of remote-sensing-based land use monitoring in J&K's Himalayan terrain, providing a methodological template directly applicable to plantation governance. Climate adaptation measures should include development of heat-tolerant and drought-resistant mulberry varieties and integration of sericulture plantation management within the UT's broader climate resilience planning framework. Islam et al. (2015) propose that strategic expansion of mulberry cultivation on degraded hillside parcels could simultaneously enhance leaf supply and deliver ecosystem services including soil stabilization, carbon sequestration, and biodiversity support.

6.3 Gender-Transformative Approaches to Women's Economic Empowerment

Converting women's dominant participation in sericulture labour into genuine economic agency requires three priority interventions. First, dedicated credit products for women sericulture entrepreneurs—with eligibility criteria, collateral requirements, and repayment structures designed to reflect women's specific asset base and income patterns—are needed to enable women-led enterprise development beyond household rearing. Second, women-controlled marketing cooperatives or self-help groups linked directly to processing units and market platforms would enable women to capture a larger share of the value generated by their labour, bypassing male-dominated intermediary chains (Choudhury & Bhattacharya, 2015). Third, extension services must be restructured to deliver training, technical information, and enterprise advisory support directly to women, rather than routing it through male household heads (Rao, 2017).

6.4 Data Governance Reform as a Prerequisite for Evidence-Based Policy

The pervasive data gaps identified throughout this study represent a fundamental failure of sectoral governance that prevents accurate diagnosis of problems, rigorous evaluation of interventions, and rational allocation of public resources. Addressing these gaps requires: standardized reporting templates for all DSOs, with mandatory disaggregation by gender, crop variety, production stage, and geographic unit; digital data collection systems enabling real-time data entry, validation, and aggregation; independent verification mechanisms; and publicly accessible data portals. Singh et al. (2020) demonstrate that agricultural data governance reforms in comparable Indian states have significantly improved policy targeting efficiency and resource utilization in the sericulture sector.

6.5 Market Diversification and Export Integration

J&K's near-complete dependence on domestic buyers for cocoon revenue—reflected in consistently NIL export figures across reporting districts—exposes producers to regional price volatility and forecloses access to premium international market prices. Developing export linkages requires: quality certification of J&K bivoltine silk under internationally recognized standards; development of a J&K silk geographic indication (GI) brand building on the model of Mysore Silk and Assam Muga Silk; participation in international silk trade fairs facilitated by the Central Silk Board; and establishment of dedicated export facilitation infrastructure including testing laboratories, grading facilities, and export documentation support. The global market for premium natural silk represents a significant and as-yet untapped commercial opportunity for Kashmir's sericulture sector (Sahay & Tripathi, 2018).

7. Conclusion

This study has provided a comprehensive, district-level empirical assessment of the present status of sericulture in Kashmir, integrating primary RTI data from twelve districts with economic surveys, policy documents, and an extensive peer-reviewed literature base. The analysis confirms a sector at a critical inflection point: the measurable revival in primary cocoon production—anchored by the region’s exceptional bivoltine silk quality, targeted policy investment through Silk Samagra-2 and HADP, and consistently growing farmer participation—demonstrates what is achievable when institutional support is aligned with ecological endowment. The 17.6% year-on-year growth in cocoon output between 2022–23 and 2023–24, the consolidation of Kupwara and Pulwama as high-performance production hubs, and the expanding engagement of women across most districts collectively point to a sector with genuine developmental momentum. Yet this momentum is constrained by equally persistent structural vulnerabilities that the data document with clarity. The annual loss of over ₹20 crore in value due to outward cocoon exports, the paucity of reeling and processing infrastructure, the systematic exclusion of women from financial and market empowerment mechanisms, the environmental threats to the mulberry resource base, and the pervasive data governance failures—these are not peripheral challenges but foundational impediments to the sector’s transformation into a fully integrated, export-competitive silk economy.

Sericulture’s significance in J&K extends well beyond its direct economic metrics. As a climate-adapted, household-based, and culturally embedded agro-industry that employs 1,246 documented women

workers across twelve districts and sustains 27,000–33,000 rural households, it represents a model of inclusive, ecologically grounded livelihoods uniquely suited to the constraints and endowments of a mountain economy. Realizing its full potential through the five strategic pathways identified in this study would advance SDG 1 (poverty reduction), SDG 5 (gender equality), SDG 8 (decent work and rural economic growth), SDG 13 (climate-resilient livelihoods), and SDG 15 (sustainable management of terrestrial ecosystems) simultaneously. This multi-dimensional developmental alignment makes the strengthening of Kashmir's sericulture sector not merely a sectoral policy priority but a contribution to the broader architecture of sustainable and equitable development in one of India's most ecologically and socio-politically complex regions.

Declarations

Ethical Approval: Not applicable.

Consent to Participate: Not applicable.

Consent to Publish: Not applicable.

Conflict of Interest: The authors declare no conflict of interest.

Data Availability: The datasets analysed during the current study are derived from secondary administrative sources, including RTI-based data obtained from the Directorate of Sericulture, Jammu and Kashmir, and publicly available reports such as the Economic Survey 2024–25 and Central Silk Board publications. The compiled dataset used for analysis is available from the corresponding author on reasonable request.

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Figures

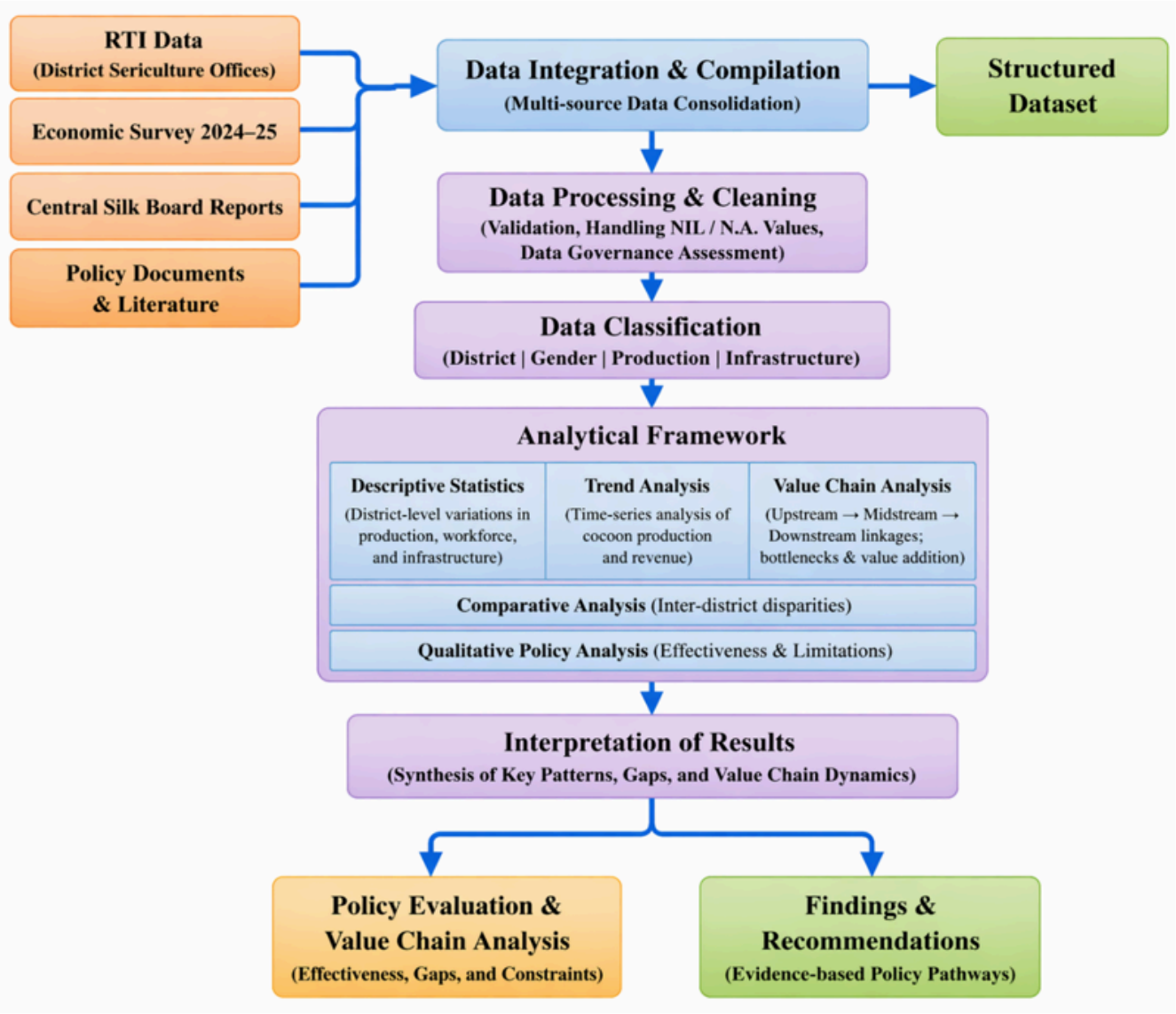


Figure 1

Methodological workflow of the study illustrating integration of RTI-based administrative data and secondary sources, followed by data processing, classification, analytical framework application, and interpretation leading to policy evaluation and recommendations

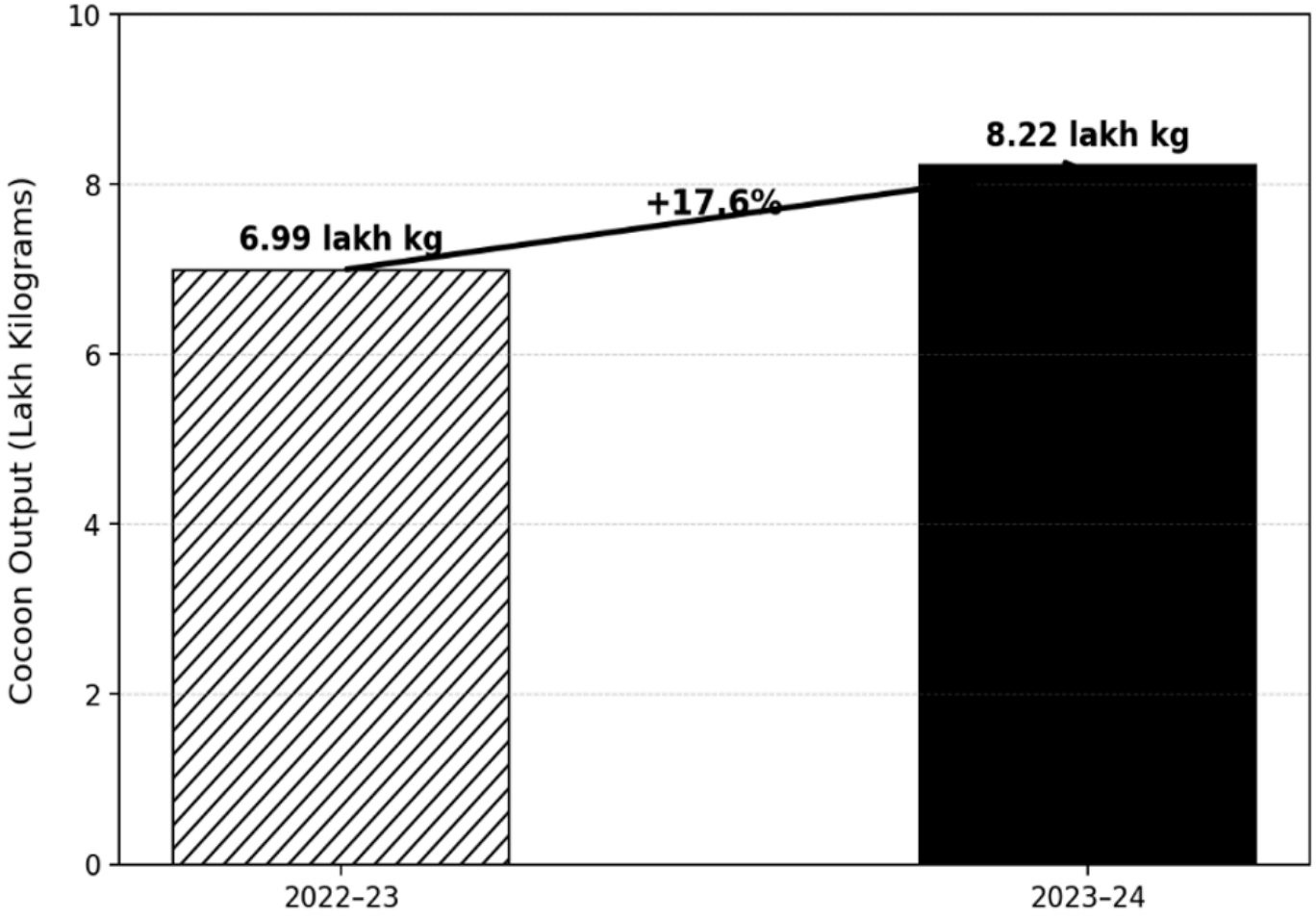


Figure 2

Year-on-year increase in cocoon production in Jammu and Kashmir, rising by 17.6% from 6.99 lakh kg (2022–23) to 8.22 lakh kg (2023–24), reflecting recent policy-driven gains in primary sericulture production. Source: Economic Survey 2024–25, Government

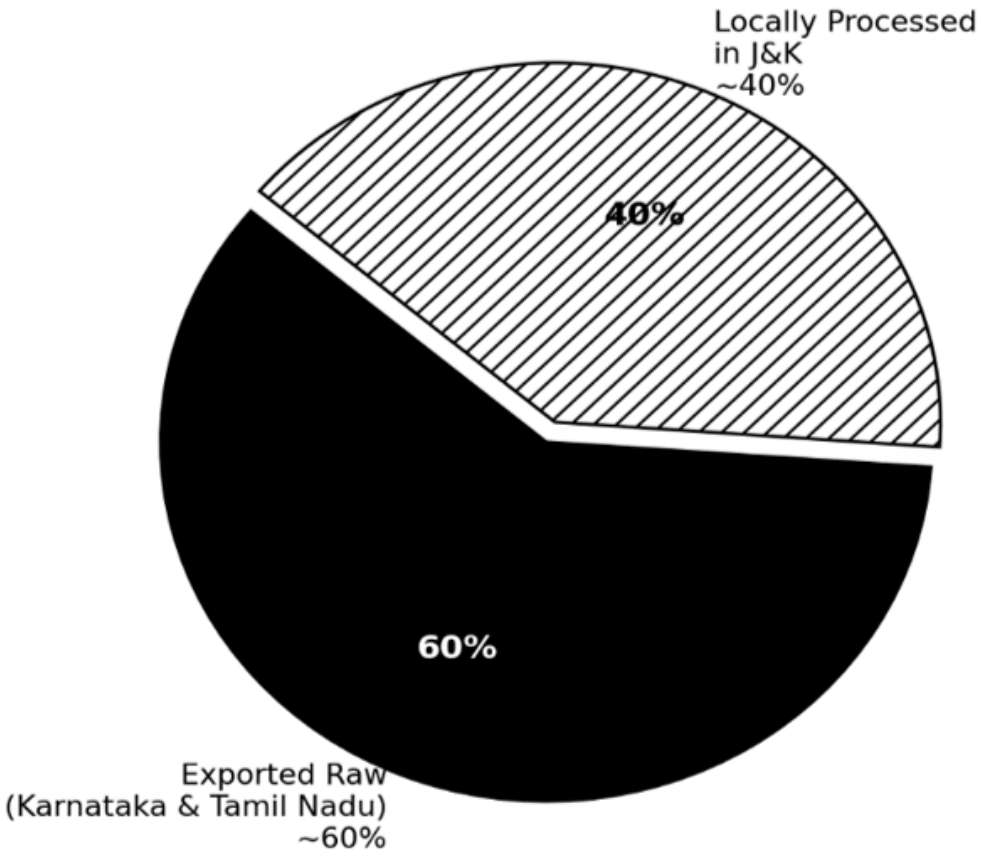


Figure 3

Distribution of J&K Cocoon Output: Local Processing vs. Export to Other States Source: Akmali (2024a); RTI Application No. PEO/RTI/2025-26/892-95.

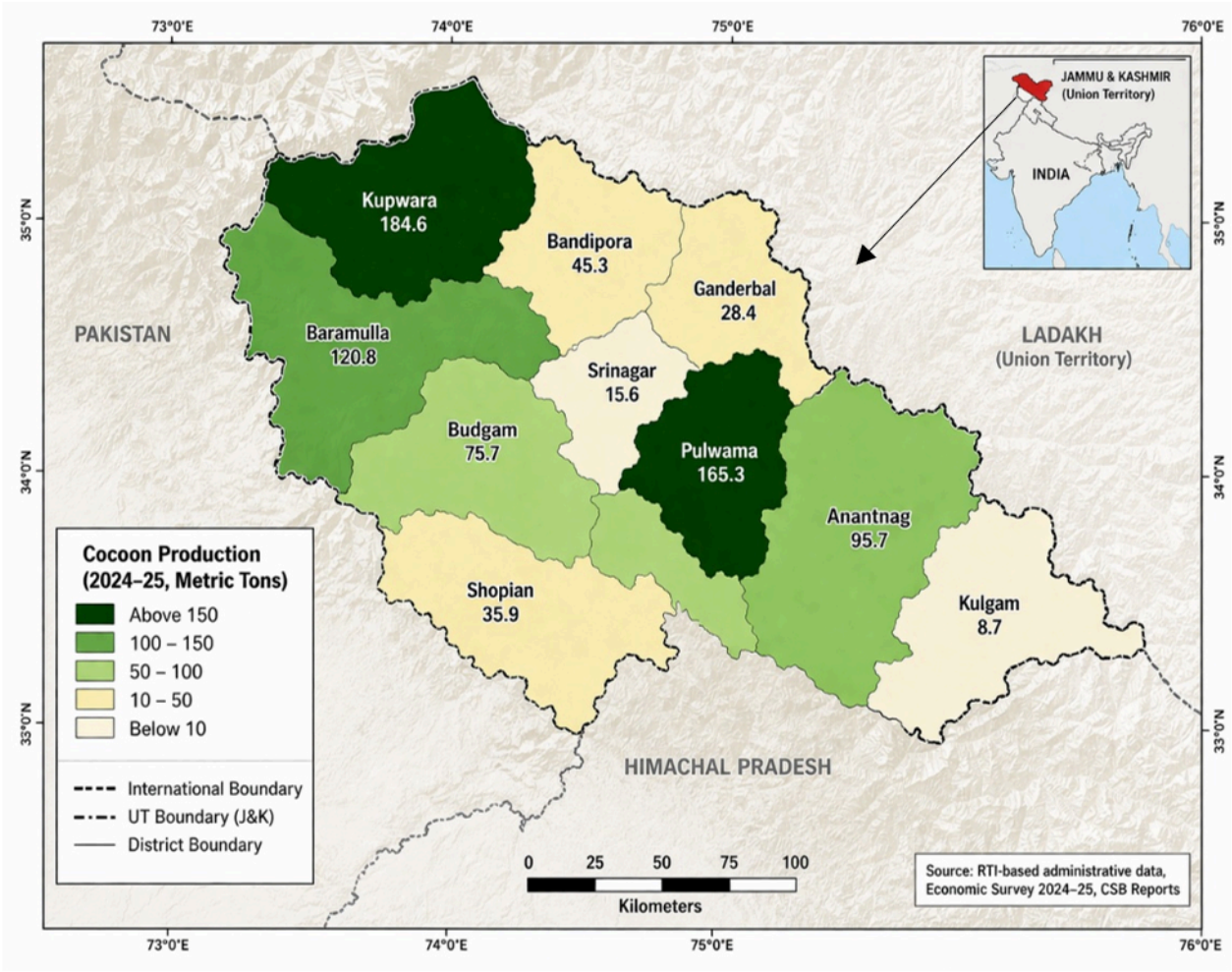


Figure 4

District-wise Spatial Distribution of Cocoon Production in Kashmir (2024–25)

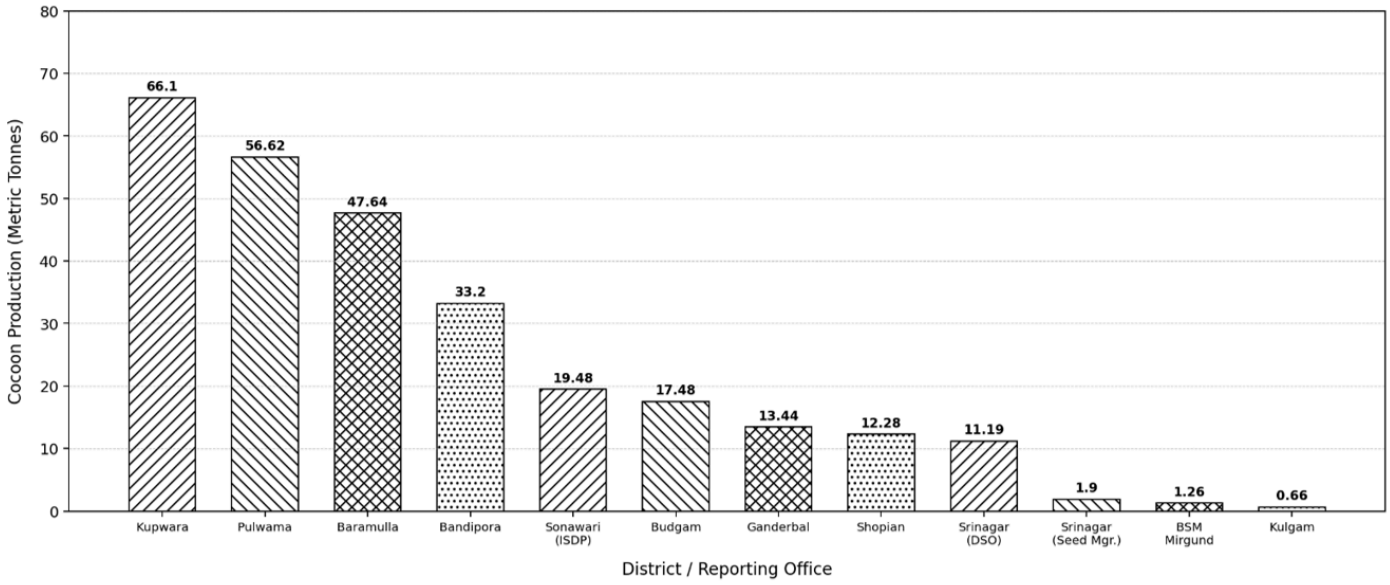


Figure 5

District-wise Cocoon Production in Kashmir (2024, Metric Tonnes) Source: RTI Application No. PEO/RTI/2025-26/892-95.

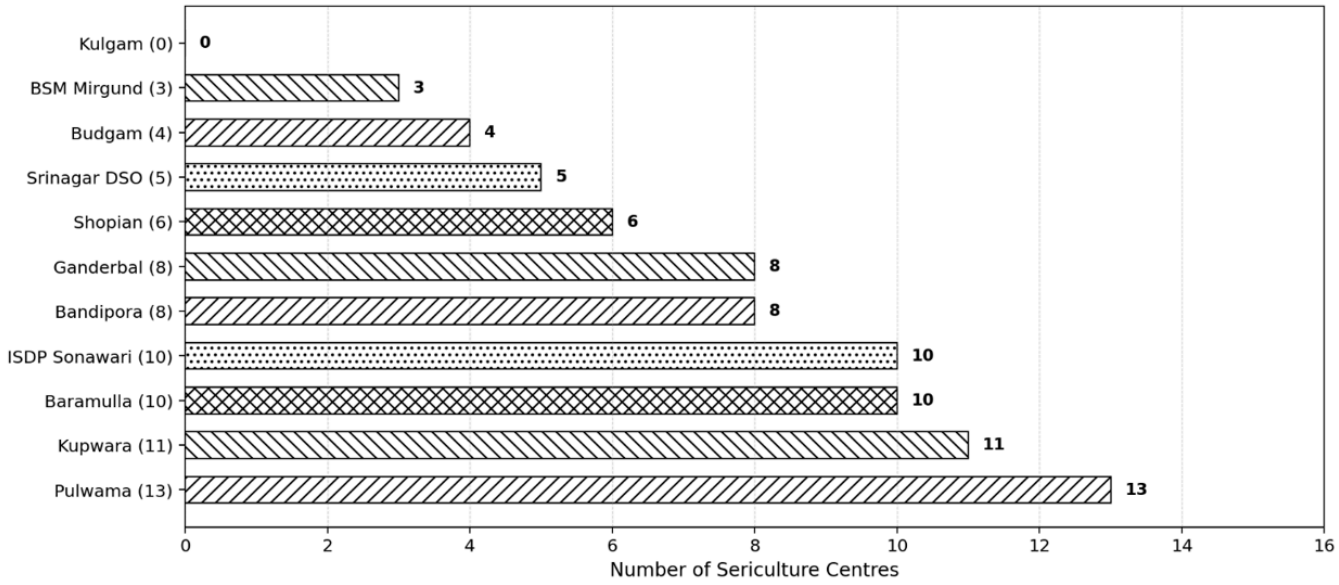


Figure 6

Number of Sericulture Centres per District / Reporting Office Source: RTI Application No. PEO/RTI/2025-26/892-95.