



Modelling the Pathways to Sustainable Sericulture Production: Role of Farmer Characteristics and Management Approaches

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Abstract

Sericulture is an important rural livelihood enterprise that contributes to employment, income generation and sustainable agricultural development. However, the sustainability of sericulture is influenced by a complex interaction among farmer characteristics, access to resources and the management practices adopted in mulberry cultivation and silkworm rearing. The present study, conducted during 2026, examined the pathways influencing sustainable sericulture production in a traditional sericultural district of Karnataka. An ex-post facto research design was employed and 120 sericulture farmers were selected through a multistage sampling procedure from 12 villages of Kanakapura and Chennapatna taluks. Data were collected through a structured and pre-tested interview schedule and analysed using descriptive statistics, Karl Pearson's correlation, multiple regression, step wise regression and path analysis. The findings revealed that more than half (55.00%) of the respondents had medium levels of sustainability and management practices (42.50%). Correlation analysis indicated that achievement motivation, cosmopolitanism and extension contact had significant positive relationships with sustainability, whereas age, material possession and economic motivation were significantly associated with management practices. Path analysis showed that economic motivation exerted a significant positive direct effect, whereas training undergone had a significant negative direct effect on management practices. The conceptual model highlights the interconnected role of farmer characteristics, management approaches, resource utilization and waste recycling in achieving ecological, economic, social and institutional sustainability. The study emphasizes strengthening extension support, farmer exposure, resource access and context-specific capacity-building interventions to promote sustainable sericulture production.

Keywords: Sericulture; Sustainability; Management Practices; Path Analysis; Cosmopolitanism

Introduction

Sericulture has long been an important component of the rural livelihood system, providing employment and regular income to farm families through the integrated activities of mulberry cultivation and silkworm rearing (Sharma and Bali, 2018 [39]). It has been recognized as an important livelihood income-generating enterprise, particularly for small and, marginal farm households, because of its relatively high employment potential and compatibility with diversified farming systems (Dandin and Giridhar, 2010 [9]; Sridhar, *et al.* 2016 [43]; Rabha, *et al.* 2023 [32]). Studies have also highlighted the contribution of sericulture towards social betterment, economic empowerment and livelihood opportunities among rural households (Geetha and Indira, 2010 [14]; Rajeshwari and Savithri, 2015 [33]; Hosamani, *et al.* 2023 [17]). Beyond its economic contribution, sericulture has the potential to support sustainable agricultural development because it combines crop production, livestock-like rearing activities, family labour and locally available resources within a relatively small landholding. However, the sustainability of sericulture is not determined by production or income alone. It is shaped by a complex interaction of ecological, economic, social and institutional factors, as well as by the way farmers manage their resources and production practices (Datta, 2010 [10]; Dandin and Giridhar, 2012 [9]; Altman and Brain, 2022 [4]).

The sustainability potential of sericulture is also associated with the scope for recycling and efficient utilization of farm resources. Silkworm litter and other sericultural wastes can be utilized as organic manure, substrate and other value-added products, thereby contributing to circular and eco-friendly production systems (Bisaria, *et al.* 1989 [7]; Patil, *et al.* 2013 [31]; Shen, *et al.* 2024 [40]). The adoption of integrated nutrient management, integrated pest and disease management, eco-friendly technologies and organic production practices has similarly been emphasized as an important pathway for sustainable sericulture development (Kumaresan, *et al.* 2011 [20]; Senugupta, 2014 [37,38]; Shivakumar and Chandrappa, 2017 [8]; Lakshmanan, *et al.* 2016 [22]). Thus, the sustainability of sericulture cannot be understood merely in terms of cocoon production or income, but should encompass ecological, economic, social and institutional dimensions.

However, sericulture is increasingly confronted with several production and sustainability challenges. Climate variability and

changing environmental conditions can adversely affect mulberry growth, silkworm performance and cocoon productivity, thereby increasing production risks (Mahimasanthi, *et al.* 2018 [23]; Bhat, *et al.* 2024 [6]; Sujatha, *et al.* 2024 [44]). Studies have also documented constraints relating to technological adoption, availability of inputs, labour, pest and disease management, access to information and marketing among sericulture farmers (Chandrappa, *et al.* 2020 [8]; Hatibarua, *et al.* 2021 [16]; Moulasab and Sudhakara, 2017 [27]; Kankanawadi, *et al.* 2025 [18]). Therefore, the sustainability of sericulture is determined not by production or income along, but by a complex interaction of ecological, economic, social, institutional and managerial factors, as well as by the manner in which farmers organize and manage their available resources.

Traditional sericultural regions, where sericulture has been practiced for generations, provide an interesting context for understanding these interactions. Farmers in these areas often possess accumulated experience, indigenous knowledge, established infrastructure and stronger linkages with markets and extension systems. Previous studies have shown that socio-economic characteristics, farming experience and access to institutional and informational resources influence the adoption of improved sericulture technologies and farming performance (Krishnamoorthy, *et al.* 2014 [19]; Goswami, *et al.* 2019 [15]; Manjunath, *et al.* 2019 [24]; Lakshmanan, 2025 [22]). Studies conducted in Karnataka have also indicated variations in sericulture practices and technological adoption across different production situations and regions (Somasekhar, *et al.* 2018 [42]; Patil and Kalal, 2020 [30]; Swamy, *et al.* 2021 [45]).

At the same time, traditional production systems are also exposed to emerging challenges such as rising production costs, labour scarcity, changing climatic conditions, declining natural resource quality and the need to adopt more sustainable management practices. Economic and marketing constraints have been reported as important concerns affecting the profitability and continuity of sericulture farming (Elumalai and Muruges, 2019 [12]; Chandrappa, *et al.* 2020 [8]). Similarly, climate-related stresses and technological gaps may affect the efficiency and sustainability of mulberry cultivation and silkworm rearing (Sakthivel, *et al.* 2012 [36]; Mahimasanthi, *et al.* 2018 [23]; Bhat, *et al.* 2024 [6]). Therefore, understanding why some farmers

achieve higher levels of sustainability than others requires looking beyond individual practices or isolated farmer characteristics.

Sustainability in sericulture can be viewed as the outcome of multiple interconnected pathways. Farmers' socio-economic characteristics, access to resources, knowledge, training, extension support, information exposure and management approaches may directly or indirectly influence the sustainability of their sericultural enterprise. Earlier studies have demonstrated that farmer characteristics and psychological attributes are associated with the adoption of agricultural and sericultural technologies (Goswami, *et al.* 2019 [15]; Manjunath, *et al.* 2019 [24]; Reddy, *et al.* 2019 [34]). Training has also been found to improve farmers' knowledge and adoption of recommended and sustainable sericulture practices (Lakshmanan, *et al.* 2012 [22]; Kumari Vijaya and Rajan, 2019 [21]; Ahmed, *et al.* 2024 [2]; Ahammed, *et al.* 2026 [1]).

Extension services and access to information constitute another important pathway influencing farmers' management decisions and technology adoption. Agricultural extension plays a significant role in facilitating access to knowledge, technologies and advisory support (Anderson and Feder, 2004 [5]), while information and communication technologies can improve farmers' access to agricultural information and strengthen decision-making (Aker, 2011 [3]; Mittal and Mehar, 2016 [26]). In the context of sericulture, extension contact and training have been associated with improved adoption of recommended production technologies (Geetha Devi, *et al.* 2018 [13]; Lakshmanan, *et al.* 2012 [22]). Likewise, recent evidence from Karnataka has identified information sources and field-level constraints as important factors influencing farmers' production decisions and adoption behaviour (Kankanawadi, *et al.* 2025 [18]).

Although previous studies have examined different aspects of sericulture, including technology adoption, training, extension support and farmer characteristics, limited attention has been given to how these factors collectively influence sustainability. In particular, the direct and indirect pathways linking farmer characteristics, management practices and sustainability have not been adequately explored in traditional sericultural areas of Karnataka.

Against this background, the present study, "Modelling the Pathways to Sustainable Sericulture Production: Role of Farmer

Characteristics and Management Approaches," was undertaken to examine these relationships using a path-based approach. The study integrates farmer characteristics and management practices to understand their contribution to sustainable sericulture production and provide insights for strengthening extension and farmer-oriented interventions.

Methodology

The present study, conducted during 2026, employed an *ex-post facto* research design to understand the factors and pathways influencing sustainability among sericulture farmers in a traditional sericultural district of Karnataka. The study was carried in two taluks of Bengaluru South district *i.e.*, Kanakapura (High production, 104 MT) and Chennapatna (Low production, 85 MT) as on 2023-24 data. Both high- and low-production taluks were selected to ensure representation of farmers from different production situations and to avoid restricting the sample to a single type of production setting.

Sampling framework and sample size

A multistage sampling procedure was followed for the selection of respondents. Within each taluk 6 villages comprising of 3 high-production and 3 low-production villages were selected to maintain heterogeneity among the respondents. From each village, 10 sericulture farmers were randomly selected. Hence, from 2 taluks a total of 12 villages and 120 farmers were selected for the study.

Measurement of sustainability

Sustainability of sericulture was measured using a structured sustainability scale developed for the study. The scale covered seven dimensions, namely ecological, economic, social, technological and innovative, policy and institutional, health, and physical dimensions. Statements representing these dimensions were finalized through expert consultation and item analysis. The final scale consisted of 69 statements, including both positive and negative statements. Each statement was measured on a five-point continuum ranging from strongly agree (5) to strongly disagree (1), with reverse scoring for negative statements. The individual scores were summed to obtain the overall sustainability score for each respondent. Based on the total scores, respondents were categorized into low, medium and high sustainability groups using the mean and standard deviation as the basis for classification.

Measurement of management practices

Management practices followed by the farmers were measured using a Management Practices Index developed for the study. The index covered five major areas of sericulture management, namely mulberry cultivation, silkworm rearing, integrated pest and disease management (IPDM), human resource management and waste management. The finalized index comprised 27 sub-items under these five indicators. Each practice was scored based on its level of adoption/use by the respondents, and the scores were aggregated to obtain the overall management-practice score. The scores were further standardized to facilitate comparison of management practices across the respondents. Based on the obtained scores, farmers were classified into low, medium and high levels of management practices.

Data collection and model development

Study relies both on primary data and secondary data. Primary data was collected by personnel interview method using well structures, pre-tested interview schedule and secondary data about production statistics was collected from the Department of Sericulture, Bengaluru South. The collected data were coded, tabulated and analysed using appropriate statistical techniques like Karl Pearson's correlation analysis, regression analysis, path analysis, step wise regression and other statistical tools.

Results and Discussion

An examination of findings in Table 1 shows the distribution of sericulture farmers according to selected socio-psychological and resource characteristics revealed considerable variation in their access to information, training and rearing resources.

- **Extension contact:** A relatively higher proportion of the respondents (42.50%) had low extension contact, followed by high (35.80%) and medium (21.70%) levels. The predominance of farmers with low extension contact indicates that a substantial section of the respondents had limited interaction with extension agencies, which could affect their access to timely technical information and improved sericultural practices. The obtained results are in line with Geetha Devi., *et al.* (2018) [13], Lakshmanan., *et al.* (2012) [22].
- **Cosmopoliteness:** Nearly half of the respondents (47.50%) belonged to the medium cosmopoliteness category, followed

by the low (28.33%) and high (24.17%) categories. The predominance of farmers with a medium level of cosmopoliteness suggests that they had moderate exposure to places, institutions and sources of information beyond their immediate locality. Such exposure may facilitate access to new ideas, technologies and market-related information. However, the relatively smaller proportion of highly cosmopolite farmers indicates that regular interaction with external institutions and progressive farming environments was limited among a considerable section of the respondents. The obtained results can be supported by findings of Desai (1981) [11].

- **Economic motivation:** With regard to economic motivation, 43.33 per cent of the respondents belonged to the low category, followed by the high (31.67%) and medium (25.00%) categories. The predominance of respondents with low economic motivation may suggest that sericulture was perceived primarily as a source of livelihood rather than as a commercially oriented enterprise. Nevertheless, the presence of nearly one-third of respondents in the high economic-motivation category indicates that a considerable proportion of farmers were oriented towards improving their income and economic returns from sericulture. Such differences in economic orientation may influence farmers' willingness to invest in improved technologies and adopt efficient management practices. The findings are in line with Nagaraja (1989) [28].
- **Training exposure:** Training exposure was generally limited, with only 21.67 per cent of the respondents having undergone fewer than three training programmes, while none had attended more than three programmes. Similarly, most of the trained respondents had received training for less than three days (16.67%). The limited frequency and duration of training may have constrained opportunities for farmers to strengthen their technical skills and adopt improved sericultural practices.
- **Material possession:** All the respondents possessed rearing stands (100.00%), while a majority owned leaf-cutting knives (85.00%), sprayers (67.50%) and leaf baskets/leaf chambers (61.67%). However, the possession of specialized equipment was relatively low, particularly hygrometers (6.67%), chawki rearing boxes (10.83%),

bed-cleaning nets (13.33%), generators (15.00%) and dry/wet thermometers (18.33%). This pattern indicates that although basic reading materials were widely available, the adoption of equipment required for scientific and precise environmental management was limited. Such variation

in material possession may be associated with differences in farmers' investment capacity, technical awareness and access to training.

Sl. No.	Components		Category	f	%
1	Extension contact		Low (Less than 0.53)	51	42.50
	Medium (Between 0.54 to 1.94)		26	21.70	
	High (More than 1.94)		43	35.80	
2	Cosmopoliteness		Low (Less than 4.71)	34	28.33
	Medium (Between 4.72 to 6.42)		57	47.50	
	High (More than 6.43)		29	24.17	
3	Economic Motivation		Low (Less than 7.20)	52	43.33
	Medium (Between 7.3 to 8.38)		30	25.00	
	High (More than 8.38)		38	31.67	
4	Training undergone	Number of trainings (in numbers)	Less than 3	26	21.67
			Between 3 to 5	0	0.00
			More than 5	0	0.00
		Duration of training (in days)	Less than 3 days	20	16.67
			Between 3 to 5 days	6	5.00
			More than 5 days	0	0.00
5	Material possession		Rearing stands	120	100.00
	Rearing trays		51	42.50	
	Chopping board		44	36.67	
	Bed cleaning nets		16	13.33	
	Bed cleaning nets		22	18.33	
	Dry/Wet thermometer		61	50.83	
	Mountages/Chandrikeys/Mounting nets		48	40.00	
	Mountages/Chandrikeys/Mounting nets		102	85.00	
	Foam pads/paraffin paper		13	10.83	
	Leaf cutting knives		8	06.67	
	Chawki rearing box		81	67.50	
	Chawki rearing box		74	61.67	
	Hygrometer		18	15.00	
	Sprayers				
	Leaf baskets/leaf chamber				
Generator					

Table 1: Distribution of sericulture farmers according to their selected profile characteristics (n = 120).

The distribution of respondents according to their overall sustainability level is depicted in Table 2 which revealed that, more than half of the sericulture farmers (55.00%) belonged to the medium sustainability category, followed by the low (24.17%) and high (20.83%) categories. The predominance of farmers in the medium category suggests that, although sustainable practices were being followed to a certain extent, there was still considerable scope for improvement. The presence of nearly one-fourth of the respondents in the low sustainability category may be attributed to differences in access to resources, technical knowledge, institutional support and adoption of sustainable production practices (Lakshmanan., *et al.* 2016 [22]; Kumaresan., *et al.* 2011 [20]; Shivakumar and Chandrappa, 2017 [41]). At the same time, the proportion of farmers in the high sustainability category indicates that some respondents had successfully integrated sustainable practices into their sericultural enterprise (Senugupta, 2014 [37]; Altman and Brain, 2022 [4]).

With regard to overall management practices, 42.50 per cent of the respondents belonged to the medium category, followed by the

low (30.00%) and high (27.50%) categories. The concentration of respondents in the medium category indicates a moderate level of adoption of recommended management practices (Krishnamoorthy., *et al.* 2014 [19]; Patil and Kalal, 2020 [30]; Swamy., *et al.* 2021 [45]). However, the presence of 30.00 per cent of respondents in the low category suggests that certain farmers were still not adequately adopting improved practices across different components of sericulture (Sakthivel., *et al.* 2012 [36], Moulasab and Sudhakara, 2017 [27]). This variation in management practices may be associated with differences in farmers' access to extension services, training, resources and technical knowledge. The findings collectively suggest that strengthening farmers' capacity and improving access to appropriate technologies and institutional support could help move a greater proportion of respondents towards higher levels of both management practices and overall sustainability (Lakshmanan., *et al.* 2012 [22]; Ahammed., *et al.* 2026 [1]).

Sl. No.	Components	Category	<i>f</i>	%
1	Sustainability	Low (Less than 239.36)	29	24.17
		Medium (Between 239.35 to 262.19)	66	55.00
		High (More than 262.19)	25	20.83
2	Management practices	Low (Less than 0.75)	36	30.00
		Medium (Between 0.75 to 0.81)	51	42.50
		High (More than 0.81)	33	27.50

Table 2: Categorization of sericulture farmers based on sustainability and management practices followed (n = 120).

The correlation analysis presented in Table 3 revealed that, achievement motivation, cosmopolitaness and extension contact had a positive and significant relationship with sustainability. Among these variables, extension contact showed the strongest association ($r = 0.302$, $p < 0.01$), indicating the importance of farmers' interaction with extension personnel in promoting sustainable sericulture practices (Anderson and Feder, 2004 [5]). The remaining profile characteristics showed no significant relationship with sustainability.

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Sl. No.	Profile characteristics	Sustainability		Management practices	
		r	p value	r	p value
1	Age	0.136 ^{NS}	0.139	0.194*	0.034
2	Education	0.016 ^{NS}	0.859	-0.013 ^{NS}	0.885
3	Nature of family	0.034 ^{NS}	0.713	-0.017 ^{NS}	0.850
4	Family annual income	0.093 ^{NS}	0.314	0.001 ^{NS}	0.222
5	Experience in Sericulture farming	0.147 ^{NS}	0.108	0.140 ^{NS}	0.127
6	Material possession	0.143 ^{NS}	0.120	0.247**	0.006
7	Innovativeness	0.078 ^{NS}	0.396	0.073 ^{NS}	0.429
8	Achievement motivation	0.212*	0.020	0.063 ^{NS}	0.494
9	Risk orientation	0.005 ^{NS}	0.956	0.054 ^{NS}	0.556
10	Economic motivation	0.139 ^{NS}	0.130	0.266**	0.003
11	Credit orientation	0.104 ^{NS}	0.258	0.099 ^{NS}	0.280
12	Cosmopolitaness	0.267**	0.003	0.068 ^{NS}	0.457
13	Mass media exposure	-0.024 ^{NS}	0.797	0.135 ^{NS}	0.142
14	Training undergone in sericulture	0.137 ^{NS}	0.137	-0.128 ^{NS}	0.165
15	Extension contact	0.302**	0.00	0.098 ^{NS}	0.287
16	Extension participation	0.084 ^{NS}	0.360	0.024 ^{NS}	0.796
17	Scientific orientation	0.152 ^{NS}	0.097	0.007 ^{NS}	0.937

Table 3: Karl Pearson correlation analysis of profile characteristics of sericulture farmers with their sustainability and management practices (n = 120).

**One per cent level of significance, * Five per cent level of significance, NS-Non significance, r- Correlation co-efficient.

The regression analysis showed that age was the only profile characteristic having a significant positive effect on both sustainability ($\beta = 2.715, p = 0.049$) and management practices ($\beta = 0.719, p = 0.040$). This indicates that increased age and the associated farming experience may contribute to better sustainability and management of sericulture enterprises (Goswami, *et al.* 2019 [15]; Monahar, *et al.* 2025 [25]). The remaining profile characteristics did not exert a significant individual influence on either sustainability or management practices. The regression models explained 23.6 and 23.7 per cent of the variation in sustainability and management practices, respectively, indicating that other factors beyond the selected profile characteristics may also influence these outcomes (Table 4).

The stepwise regression analysis identified extension contact and cosmopolitaness as significant predictors of sustainability. Extension contact alone explained 12.9 per cent of the variation in sustainability ($R^2 = 0.129$), which increased to 15.7 per cent with the inclusion of cosmopolitaness ($R^2 = 0.157$). This highlights the role of farmers' interaction with extension agencies and their external exposure in improving sustainability (Andreson and Feder, 2004 [5]).

In the case of management practices, material possession showed a positive and significant contribution, whereas training had a negative and significant association. This indicates that having the required resources may help farmers follow better management practices. The negative association of training may be

Sl. No.	Profile characteristics	Sustainability		Management practices	
		β	p value	β	p value
1	Age	2.715*	0.049	0.719*	0.040
2	Education	-0.561 ^{NS}	0.799	-0.577 ^{NS}	0.795
3	Annual income	0.096 ^{NS}	0.296	0.001 ^{NS}	0.659
4	Nature of family	0.521 ^{NS}	0.868	0.494 ^{NS}	0.876
5	Experience in Sericulture farming	-0.314 ^{NS}	0.497	-0.317 ^{NS}	0.495
6	Material possession	0.345 ^{NS}	0.824	0.406 ^{NS}	0.804
7	Innovativeness	0.211 ^{NS}	0.881	0.209 ^{NS}	0.883
8	Achievement motivation	1.252 ^{NS}	0.468	1.270 ^{NS}	0.465
9	Risk orientation	-0.662 ^{NS}	0.359	-0.670 ^{NS}	0.358
10	Economic motivation	0.991 ^{NS}	0.625	1.042 ^{NS}	0.617
11	Credit orientation	1.529 ^{NS}	0.205	1.555 ^{NS}	0.207
12	Cosmopolitaness	1.403 ^{NS}	0.348	1.390 ^{NS}	0.356
13	Mass media exposure	-3.582 ^{NS}	0.251	-3.543 ^{NS}	0.261
14	Training undergone in sericulture	4.629 ^{NS}	0.442	4.530 ^{NS}	0.459
15	Extension contact	2.875 ^{NS}	0.183	2.889 ^{NS}	0.184
16	Extension participation	1.298 ^{NS}	0.293	1.281 ^{NS}	0.305
17	Scientific orientation	0.508 ^{NS}	0.447	0.500 ^{NS}	0.458
Model fit		R ² = 0.236		R ² =0.237	

Table 4: Multiple regression analysis of profile characteristics of sericulture farmers with sustainability and management practiced followed (n = 120).

**One per cent level of significance, * Five per cent level of significance, NS-Non significance, B-Regression co-efficient, SE-Standard Error.

due to differences in the relevance and practical usefulness of the training received (Krishnamoorthy, *et al.* 2014 [19]; Sakthivel, *et al.* 2012 [35]). In the traditional sericultural district, most farmers have considerable experience in sericulture and often follow the management practices gained through years of experience. Therefore, their dependence on formal training may be relatively less, which could partly explain the negative association observed between training and management practices.

The path analysis indicated that economic motivation had a positive and significant direct effect on management practices ($\beta = 0.221$, $p = 0.018$), whereas training undergone in sericulture had a significant negative direct effect ($\beta = -0.228$, $p = 0.048$). The remaining variables showed non-significant direct effects. Further, all the variables exhibited negligible and non-significant indirect effects. The findings suggest that economic motivation plays an important role in influencing management practices, while the

Sl. No.	Predictor variable	Sustainability		Management practices	
		R ²	F	R ²	F
1	Extension Contact	0.129	17.406**		
2	Extension Contact +Cosmopoliteness	0.157	10.909**		
3	Material possession			0.355**	0.00
4	Trainings			-0.181*	0.046

Table 5: Stepwise multiple regression analysis of profile characteristics influencing on sustainability and management practices followed (n = 120).

**One per cent level of significance, * Five per cent level of significance, NS-Non significance, β - standardized regression co-efficient.

negative effect of training may indicate variations in the relevance or practical applicability of the training programmes received by the farmers (Nagaraja, 1989 [28]; Nandhini, *et al.* 2020 [29]).

Sl. No.	Variables	Direct effects		Indirect effects	
		β	p	β	p
1	Education	-0.030	0.790	-0.000	0.891
2	Experience	0.143	0.122	0.002	0.874
3	Achievement motivation	0.065	0.500	0.001	0.877
4	Economic motivation	0.221*	0.018	0.003	0.874
5	Cosmopoliteness	-0.028	0.784	-0.000	0.890
6	Training undergone in Sericulture	-0.228*	0.048	-0.003	0.874
7	Extension contact	0.207	0.096	0.003	0.874
8	Extension participation	-0.042	0.692	-0.001	0.882

Table 6: Direct and indirect effects of selected variables on sustainability through management approaches (n = 120).

**One per cent level of significance, * Five per cent level of significance, NS-Non significance, β - standardized regression co-efficient.

The conceptual model (Figure 1) illustrates the pathways through which management approaches contribute to sustainable sericulture production in traditional sericultural districts. Mulberry farming, silkworm rearing, livestock integration and market and institutional advantages form the major components of the production system. The recycling of mulberry waste, silkworm litter and farmyard manure through composting supports low-cost farm resource management by promoting efficient utilization of locally available resources and reducing dependence on external inputs. These integrated practices contribute to ecological,

economic, social, technological, institutional, health and physical dimensions of sustainability. The model further highlights the role of human resource management and integrated waste management as key drivers of sustainability, ultimately contributing to improved productivity, stable income, sustainable livelihoods and long-term sustainability (Bisaria, *et al.* 1989 [7]; Datta, 2010 [10]; Patil, *et al.* 2013 [31]).

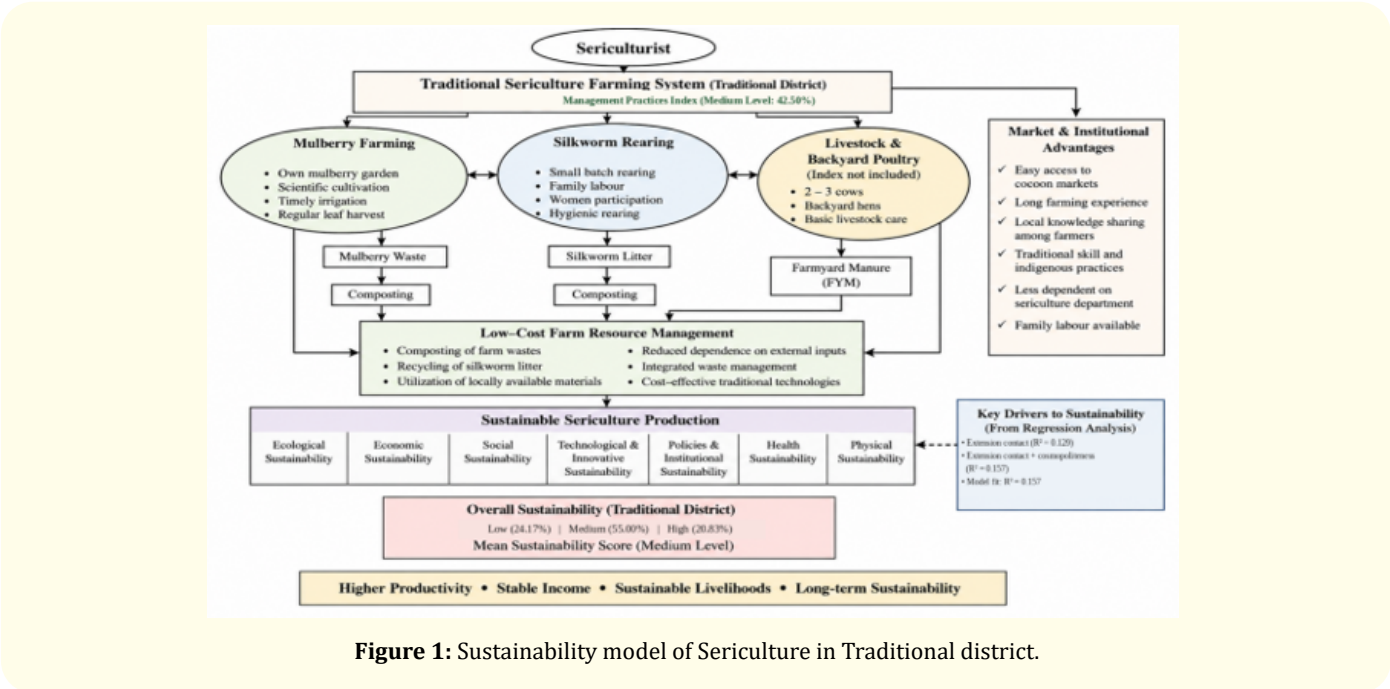


Figure 1: Sustainability model of Sericulture in Traditional district.

Conclusion

The study showed that sustainable sericulture in the traditional district was influenced by farmers’ characteristics, resource availability and management practices. More than half of the farmers belonged to the medium sustainability category, while 42.50 per cent followed management practices at a medium level, indicating scope for further improvement. Extension contact, cosmopolitanism and achievement motivation were positively associated with sustainability, while age, material possession and economic motivation were related to management practices. Path analysis showed that economic motivation had a positive direct effect on management practices, whereas training undergone had a negative direct effect. The findings suggest that sustainability can be strengthened through regular extension support, better access to essential resources, wider exposure to useful information and practical, need-based training. Promoting efficient resource use and recycling can further support sustainable sericulture and improve the long-term livelihood benefits of the enterprise.

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