Original Research Article

Evaluating the Effects of Capacity Building and Training (CBT) on Sericulture Practices of Farmers in Rajouri District of Jammu and Kashmir

ABSTRACT

This study examines the effects of capacity building and training (CBT) on sericulture farmers in Rajouri district, Jammu and Kashmir UT. The research focuses on socio-economic and communication characteristics of sericulture farmers and evaluates the impact of CBT on their farming practices. A total of 25 sericulture farmers from sub-district Nowshera in Rajouri district were selected using simple random sampling. Data on registered farmers were obtained from the Department of Sericulture, Government of Jammu and Kashmir. Paired t-tests was employed to analyze the impact of CBT after implementation. The findings reveal significant improvements in various aspects of sericulture after CBT intervention. There was a notable increase in average seed intake, cocoon production, total family income, and income from sericulture. Furthermore, the mortality rate of silkworms decreased significantly after CBT training. The area under mulberry plantation and the number of mulberry plants also witnessed substantial increases post-training. Additionally, the application of disinfectant and the number of government schemes availed showed significant improvements. Overall, the study highlights the importance of CBT in enhancing the technical capabilities of sericulture farmers and improving their farming practices. The results underscore the significance of providing training in modern technology, integrated pest management, and disease management to enhance production outcomes in Sericulture.

Keywords: Sericulture, Capacity building, Training, Socio-economic, status, Economic traits.

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1. Introduction:

Sericulture, the practice of rearing silkworms for the production of silk, holds a significant position in the socio-economic landscape of rural India. With its roots deeply embedded in ancient traditions, sericulture has evolved into a vital industry contributing to the upliftment of millions in the rural and semi-urban sectors (Ganie 2012). In India, sericulture serves as a beacon of hope for economically weaker sections, providing employment to approximately 9.2 million individuals (CSB, 2023) many of whom belong to marginalized communities. This industry, unlike conventional agricultural pursuits, stands at

the nexus of tradition and innovation, integrating principles from various scientific disciplines such as botany, zoology, physics, chemistry, and engineering. Furthermore, it intertwines art, craft, creativity and aesthetics into its fabric, quite literally, as it transforms raw materials into sought-after silk garments. Despite its rural origins, sericulture serves predominantly urban needs, reflecting a unique blend of agrarian and industrial elements. The rapid growth of the silk industry in recent years owes not only to horizontal expansion but also to vertical improvements in productivity. This sector offers low capital investment with high employment potential and quick returns, making it an attractive avenue for livelihood enhancement. However, the journey towards modernization and globalization has not been without challenges. Effective communication of technological advancements remains a critical barrier, hindering the widespread adoption of recommended practices by farmers (Illahi et al., 2016). The success of sericulture initiatives hinges on bridging the gap between technology innovators and end-users through efficient communication channels tailored to the diverse socio-cultural and economic landscape of rural India. Moreover, while technology has helped overcome many obstacles, there's still considerable untapped potential, especially in regions like Jammu and Kashmir (Sharma et al., 2022, Bhat et al., 2024). Here, sericulture serves as a subsidiary occupation for thousands of rural families, yet productivity and quality improvements remain imperative. Collaborative efforts between governmental bodies, research institutions, and grassroots organizations aim to address these challenges, emphasizing the importance of capacity building and training in enhancing silk production. Against this backdrop, present study aims to delve into the socio-economic and communication characteristics of farmers in the Rajouri district of Jammu and Kashmir. Additionally, it seeks to assess the impact of capacity building and training programs on enhancing the skills and productivity of silkworm rearers. By understanding these dynamics, policymakers and stakeholders can chart a course towards a more vibrant and sustainable sericulture industry, ensuring prosperity for rural communities and bolstering India's position in the global silk market.

2. MATERIALS AND METHODS:

This study employed a descriptive research design to investigate the knowledge, awareness, and impact (KAI) of sericulture practices among farmers in the Nowshera sub-district of Rajouri district, Jammu and Kashmir, India. The methodological steps and tools utilized for the study are outlined below:

The study focused on the Himalayan hill and mountain areas within India, specifically the north west and north east Himalayan regions. For this research, Rajouri district in the

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Jammu division was purposively selected due to its significant number of registered sericulture farmers. Nowshera sub-district within Rajouri district was selected for data collection. This area was chosen based on its concentration of registered sericulture farmers and its geographical features, including fertile, mountainous terrain. A total of 25 farmers were randomly selected from the registered list of sericulture farmers in Nowshera sub-district, using a simple random sampling method with the chit method. A descriptive research design was employed to fulfil the study objectives, aiming to combine relevance to the research purpose with efficiency in data collection and analysis (Singh and Kameswari, 2019). Data were collected through personal interview using distinctive schedule prepared covering demographic information and KAI aspects of sericulture practices during 2020-21.

Independent variables such as age, sex, education, type of house, caste, occupation, family type, family size, annual income, operational landholding, livestock possession, and major crops grown were measured using appropriate scales and classifications. The dependent variable, the impact of capacity building and training, was assessed using a modified sustainable livelihood framework. Each variable was operationalized and categorized to facilitate data collection and analysis, ensuring clarity and consistency in measurement across respondents. An interview schedule was developed, pre-tested, and finalized for data collection. Additionally, the impact of capacity building and training was assessed using recall methods and data verification from the Department of Sericulture, Rajouri. Quantitative data were analyzed using statistical techniques such as frequency, percentage, arithmetic mean, and paired t-test. These analyses helped in summarizing and interpreting the collected data, allowing for comparisons and inferences regarding the research objectives.

3.RESULTS AND DISCUSSION

This chapter deals with the reporting and interpretation of empirical data collected as per the objectives set forth for the study. The facts that emerged from statistical analysis of the data have been presented and discussed under the following subheads:

3.1. Socio Economic and Communication Characteristics of farmers

3.1.1. Age

The age composition of the respondents revealed that a significant proportion belonged to the middle and old age groups, with a smaller percentage from the young age group. The mean age of the respondents was 48.8 years, with the maximum age recorded at 73 years and the minimum at 24 years. This distribution suggests that younger farmers are less engaged in sericulture, potentially indicating a need for targeted interventions to involve

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them in this sector. Similar studies by Afroz et al. (2018) and Geetha et al. (2020) also found a higher involvement of middle-aged and older individuals in sericulture activities. These findings align with earlier study by Sharma et al., (2020) highlighting the importance of considering age demographics in agricultural interventions. Overall, the predominance of middle-aged and older farmers in sericulture activities underscores the importance of tailored strategies to engage younger individuals in the sector.

3.1.2. Sex

The data analysis revealed that the respondents were predominantly male, with 88% of the participants being male and only 12% female. This gender disparity is consistent with the societal trend of men being more actively involved in agricultural activities, while women are primarily engaged in household duties. The predominance of male respondents aligns with the broader gender dynamics observed in agricultural sectors, as reported by Afroz et al. (2018) and other researchers. Despite efforts to promote gender equality in agriculture, the involvement of women remains limited, especially in decision-making roles. These findings underscore the need for targeted interventions to enhance the participation of women in agricultural activities and decision-making processes. Addressing barriers such as lack of education, social norms, and access to resources can help create a more inclusive agricultural sector.

3.1.3. Education

The education levels of the respondents were diverse, as depicted in Table 1. The analysis revealed that 32% of the respondents had attained education up to high school level, while 20% had completed primary education. Additionally, 20% of the respondents had education at the middle level, 16% had education up to higher secondary level, and 12% were illiterate. The study area boasted a 88% literacy rate, attributed to the presence of educational institutions and favorable economic conditions. These findings are consistent with previous studies, such as Afroz et al. (2018), which reported a majority of farmers being educated up to secondary school level, with a significant proportion being functionally literate or illiterate. These findings underscore the importance of education and socio-economic factors in shaping agricultural practices and entrepreneurial endeavours. Addressing educational disparities and providing targeted support to farmers and entrepreneurs can contribute to the sustainable development of the agricultural sector.

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3.1.4. Type of House and Caste

The data from Table 1 reveals that all respondents (100%) reside in kachcha-type houses. Additionally, analysis of caste-wise distribution indicates that 60% of respondents belong to ST/SC, 28% to general Category, and 12% to OBC. These findings align with previous studies by Singh et al. (2012), suggesting a prevalence of economically disadvantaged families in the surveyed population. Notably, despite these socio-economic challenges, silkworm rearing remains a significant economic activity, generating an annual income of approximately ₹ 2026.00 lacks from the production of about 1021 metric tons of cocoons (ES, 2014).These results underscore the socio-economic context of silkworm rearing and highlight the importance of addressing housing and caste-related disparities to promote equitable economic development.

3.1.5. Occupation

Primary Occupation and Secondary Occupation

All respondents (100%) engaged in agriculture as their primary occupation, highlighting the significant reliance on farming among the sampled population. This finding resonates with previous studies (Ali et al., 2017a; Dewangan, 2017 & Ajao et al., 2020), which also reported agriculture as the primary occupation of respondents. Similarly, all respondents (100%) were involved in sericulture as their secondary occupation, indicating the importance of silk production in supplementing agricultural income. This aligns with previous research findings by Lakshmanan and Geethadevi (2017) and Sharma et al., (2017), confirming the prevalence of sericulture as a secondary occupation among rural communities.

3.1.6. Family Type, Family Size and Family Income

Family Type: In the study area, 64% of respondents lived in nuclear families, while 28% belonged to joint families, with only 8% in extended families, indicating the prevalence of the nuclear family system in rural settings. **Family Size:** About 48% of respondents belonged to medium-sized families (4-5 members), while 44% were from large families (6-7 members), and only 8% from small families (2-3 members). The average family size was 5.24, with larger families often continuing farming occupations due to available household labour. **Family Income:** Data revealed that 56% of respondents fell into the medium-income category, followed by 40% in the high-income category, and only 4% in the low-income category. For this Government of India classification (2012) was used. This suggests that most respondents rely on farming with limited diversification, although some are transitioning towards commercialized farming. Findings align with Yadav (2013), who

categorized family sizes into small, medium and large, with a majority falling into the large family category. Notably, the study area demonstrates potential for income generation through sericulture, as evidenced by the significant number of families involved and the reported income figures.

3.1.7. Operational Land Holding, Livestock Possession and Major Crops Grown

The majority of respondents (52%) possessed medium-sized land holdings (1.0 acre to 2.5 acres), while 48% had small land holdings (about 1.0 acre or less). This distribution aligns with the agricultural landscape in Rajouri district, where 70% of land holdings are small to medium farms. In case of livestock possession, among respondents, 28% owned buffaloes, followed by 20% with poultry and goats each, while only 8% had cows. Additionally, 24% possessed other types of livestock such as sheep or horses. The average livestock possession per farmer was 4.84, primarily for milk production. The major crops cultivated by respondents included wheat and mustard (Rabi crops) and maize (Kharif crop). Some also grew paddy and other crops like jowar, bajra, ginger, and soyabean. Land holding size significantly influenced agricultural decision-making, with smaller landholders facing distinct challenges. Similarly, studies by Landge and Tripathi (2006) highlighted the importance of livestock management practices, including breeding, health care, and financial management, which resonate with the present findings. These results are also consistent with the broader literature, including studies by Uniyal et al. (2019) and Rathore et al. (2019).

3.1.8. Experience in Sericulture, Number of Sericulture Crop, Method of Rearing, Type of Rearing House and Information Seeking Behaviour

Among the respondents, 12% had high sericulture experience, 56% had medium experience, and 32% had low experience. This distribution aligns closely with findings from previous studies by Sharma et al. (2022) and Geetha & Rao (2016), reflecting a range of experience levels among farmers. In case of number of Sericulture crops, about 64% of respondents cultivated two sericulture crops per year, while 36% cultivated only one crop annually. This distribution is consistent with findings by Khan et al. (2016) and Ali et al. (2017a), indicating common practices among sericulture farmers.

The method of rearing: All farmers (25) utilized tray methods for silkworm rearing. This method's widespread use is corroborated by previous study conducted by Sharma et al. (2019), reflecting its efficiency and effectiveness in sericulture practices.

Type of Rearing House: Most respondents (88%) utilized kachcha type rearing houses, while only 12% used pakka type rearing houses. This distribution aligns with observation by Rathore et al. (2019), indicating prevalent practices in rearing house construction.

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Information Seeking Behaviour: Among the 25 respondents, 68% exhibited low levels of information seeking behaviour, 16% demonstrated medium levels, and 16% showed high levels. These findings are consistent with reports of Hall et al. (2008) and Sharma et al. (2019), highlighting varied information-seeking tendencies among farmers.

Table 1: Distribution of farmers on the basis of Socio-Economic Characteristics.

Particular		Frequency (n=25)	%	Total
Age Group	Young (24-35)	5	20%	25
	Middle (36-52)	10	40%	
	Old (53-73)	10	40%	
Sex	Men	22	88%	25
	Women	3	12%	
Education level	Primary Level	5	20%	25
	Middle Level	5	20%	
	High School	8	32%	
	Higher Secondary	4	16%	
	Illiterate	3	12%	
Type of house	Kachcha	25	100%	25
	Semi-Pakka	0	0 %	
	Pakka	0	0 %	
Caste	General	7	28%	25
	OBC	3	12%	
	SC/ST	15	60%	
Primary occupation	Agriculture	25	100%	25
	Service	Nil	Nil	
	Business	Nil	Nil	
Secondary occupation	Sericulture	25	100%	25
	Service	Nil	Nil	
	Business	Nil	Nil	
Family type	Nuclear	16	64%	25
	Joint	7	28%	
	Extended	2	8%	

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Family Size	Small (2-3)	2	8%	25
	Medium (4-5)	12	48%	
	Large (6-7)	11	44%	
Family Income	Low (< Rs. 33,000 per annum)	1	4%	25
	Medium (Rs. 33001- Rs. 60,000 p.a.)	14	56%	
	High (Rs. > 60,001 p.a.)	10	40%	
Operational Land Holding	Small (1.0 acre or less)	12	48%	25
	Medium (1.0 acre to 2.5 acre)	13	52%	
	Large (more than 2.5 acre)	Nil	Nil	
Livestock ownership	Cow	2	8%	25
	Buffalo	7	28%	
	Poultry	5	20%	
	Goat	5	20%	
	Any other	6	24%	
Experience in sericulture	Low(8-20)	8	32%	25
	Medium(21-36)	14	56%	
	High(37-50)	3	12%	
Number of sericulture crops	1 crop/year	9	36%	25
	2 crop/year	16	64%	
Rearing House	Kachcha	22	88%	25
	Pakka	3	12%	
Method of rearing	Tray Rearing	25	100%	25
	Floor Rearing	Nil	0%	
Information seeking behaviour	Low(10-16)	17	68%	25
	Medium(17-23)	4	16%	
	High(24-30)	4	16%	

3.2. Impact of Capacity Building and Training (CBT) on silkworm farmers

Capacity Building and Training (CBT) offers a variety of information related to agriculture and allied sectors for the benefit of farmers. An assessment of the impact was essential so as to determine whether the portal was meeting the objectives set forth initially.

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Impact assessment would also help in measuring the changes that have occurred. Impact of Capacity Building and Training (CBT) on each of these capitals has been given below:

Table 2: Impact of Capacity Building and Training (CBT) (paired t-test)

S. No.	Parameters of silkworm rearing (Average of three years data, 2017, 2018 and 2019)	Production		t (cal.)
		Before CBT	After CBT	
a.	Average seed intake (dfls)	113	156	5.89
b.	Average production of cocoon(kg)	29.24	48.44	6.81
c.	Total family income (Rs.)	66360	76800	9.998
d.	Income from sericulture (Rs.)	6761.2	13133.2	7.31
e.	Mortality during silkworm rearing (%)	38.4	10.2	-10.08
f.	Area under mulberry plantation (Acre)	0.44	0.566	2.56
g.	Number of mulberry plants	38.52	68.32	1.91
h.	Number of disinfections	1	2	5.77
i.	Number of govt. schemes availed	0.44	1.16	4.54
j.	Average participation in ECP Programme	0.68	3.6	8.32
k.	Number of social memberships	0.16	0.88	4.88
l.	Application of disinfectant	1.68	6.2	9.41
m.	Average cocoon price (Rs.)	237.2	273.4	10.03

3.2.1. Average seed intake and Average production of cocoon

Average Seed Intake and Cocoon Production: Among 25 farmers, the average seed intake for silkworm rearing before CBT training was 113 dfls, increasing to 156 dfls after training. Paired t-test analysis indicated a significant increase in seed intake post-training ($t=5.89$, $p<0.05$). Similarly, the average cocoon production before training was 29.24 kg, rising to 48.44 kg post-training. Another paired t-test revealed a significant difference in cocoon production before and after training ($t=6.81$, $p<0.05$). These findings align with studies by Sharma et al. (2019), highlighting the positive impact of training and quality inputs on cocoon productivity. Challenges such as insufficient mulberry leaves and lack of awareness in managing harsh conditions were observed to affect cocoon productivity. These

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findings are consistent with those of Geetha & Rao (2016), Khan et al. (2016), Ali et al. (2017b) and Uniyal et al. (2019), emphasizing the importance of education and awareness in sericulture practices.

3.2.2. Total family income and Income from Sericulture

Among the 25 selected farmers, 4% fell into the low-income category (<₹ 33,000 p.a.), 56% into the medium-income category (₹ 33,001 - ₹ 60,000 p.a.), and 40% into the high-income category (>₹ 60,001 p.a.). Before CBT training, the total family income was ₹ 66,360, which increased significantly to ₹ 76,800 post-training ($t=9.998$, $p<0.05$). This rise in income can be attributed to the adoption of modern techniques and practices learned during the training sessions. Similarly, the income from sericulture also showed a significant increase after CBT training. Before training, the average income from sericulture was ₹ 6,761.2, rising to ₹ 13,133.2 post-training ($t=7.31$, $p<0.05$). This improvement underscores the positive impact of training on enhancing sericulture-related skills and productivity. Studies by Sannappa et al. (2017), Rajan et al. (2017) and Ganie et al. (2018) have highlighted various socio-economic factors influencing farmers' knowledge and adoption of agricultural practices, including income, education, and extension support. Similarly, research conducted by Ali et al. (2017b) in Jammu and Kashmir revealed the income profile of marginal farmers, aligning with findings from other studies such as Reddy and Mahadevaiah (2010) and Uniyal et al. (2019).

3.2.3. Mortality during Silkworm Rearing, Area under Mulberry Plantation and Number of Mulberry Plants

Before CBT training, the mortality rate during silkworm rearing was 38.4%, which significantly reduced to 10.2% after CBT training ($t=-10.08$, $p<0.05$). This reduction indicates the effectiveness of the training in improving silkworm rearing practices. Similarly, before training, the area under mulberry plantation was 0.44 acre, which increased significantly to 0.566-acre post-training ($t=2.56$, $p<0.05$). This expansion reflects the adoption of enhanced agricultural practices learned during the training sessions. Furthermore, the number of mulberry plants saw a significant increase after CBT training. Before training, there were 38.52 mulberry plants on average, which rose to 68.32 post-training ($t=1.91$, $p<0.05$). This rise indicates improved cultivation methods learned through training. Tripp et al. (2005) highlighted the value of training in enhancing farmers' capacity and skills, leading to improved production outcomes and income levels.

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3.2.4. Number of Disinfection and Number of Govt. Schemes Availed

Before CBT training, farmers used only one disinfection treatment, which significantly increased to two after the training ($t=5.77$, $p<0.05$). This rise demonstrates the effectiveness of the training in promoting better disinfection practices. Similarly, before training, farmers availed an average of 0.44 government schemes, which increased significantly to 1.16 post-training ($t=4.54$, $p<0.05$). This increase highlights the positive impact of the training in encouraging farmers to utilize government support schemes more effectively. These findings highlight the positive impact of training on enhancing the knowledge level of respondents. Such organized training opportunities play a crucial role in improving farming practices and overall agricultural outcomes. The results of this study align with previous findings by Roy et al. (2021), confirming the effectiveness of training programs in enhancing farmers' skills and knowledge.

3.2.5. Average Participation in ECP Programme and Number of Social Membership

Before CBT training, the average participation rate in the ECP programme was 0.68%, which significantly increased to 3.6% after the training ($t=8.32$, $p<0.05$). This notable increase indicates the significant impact of the training on encouraging more participants to engage in the ECP programme. Similarly, before training, the average number of social memberships was 0.16, which saw a significant rise to 0.88 post-training ($t=4.88$, $p<0.05$). This increase demonstrates the effectiveness of the training in fostering greater social engagement among participants. These findings highlight the significant and positive impact of training on increasing participation in the ECP programme and promoting social memberships. The results of this study are consistent with previous research by Kumar et al. (2018) & Tripp et al. (2005) confirming the effectiveness of training programs in enhancing participation rates and social engagement among participants.

3.2.6. Application of disinfectant along with number of disinfection for betterment and Average Cocoon Price

Before CBT training, the application rate of disinfectant was 1.68%, which significantly increased to 6.2% after CBT training ($t=9.41$, $p<0.05$). This notable increase demonstrates the significant impact of the training on promoting the application of disinfectants. Similarly, before training, the average cocoon price was ₹ 237.2, which saw a significant rise to ₹ 273.4 post-training ($t=10.031$, $p<0.05$). This increase indicates the effectiveness of the training in enhancing the average cocoon price. These findings highlight the significant and positive impact of training on increasing the application of disinfectants

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and improving the average cocoon price. Studies have shown that training programs for farmers can lead to various positive outcomes, including increased production and income. Additionally, successful training programs often focus on empowering farmers with knowledge and skills, rather than solely providing financial support. By addressing the specific needs of farmers and adopting effective training methodologies, such as non-formal education and learning-discovery approaches, training programs can effectively contribute to the improvement of farming practices and outcomes (Das et al. 2021).

4. Conclusion

The current study "Impact of Capacity Building and Training (CBT) on silkworm rearers of Rajouri District of Jammu and Kashmir" sheds light on various socio-economic characteristics of the farmers and the significant improvements observed after the implementation of CBT training. The study reveals that CBT training had a positive impact on several key aspects of silkworm rearing. It led to improvements in seed intake, cocoon production, total family income, income from sericulture, and a significant reduction in silkworm mortality rate. Additionally, there were notable increases in the area under mulberry plantation, the number of mulberry plants, the application of disinfectants, and the utilization of government schemes. Moreover, the research highlights the enhanced participation in Extension Contact Programme (ECP) programs and increased social membership's post-CBT training. These findings underscore the effectiveness of CBT training in empowering farmers with knowledge and skills, leading to improved practices and outcomes in sericulture.

Overall, the study demonstrates the significant positive impact of CBT training on the socio-economic aspects of silkworm rearing in Rajouri District. These findings emphasize the importance of targeted capacity-building initiatives in enhancing the livelihoods of farmers and promoting sustainable agricultural practices. Further research and continued support for such training programs are warranted to ensure continued progress and development in the sericulture sector.

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Disclaimer:

We are hereby declare that NO generative AI technologies such as (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of manuscripts.

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