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Socio-economic challenges and opportunities in sericulture: A case study of women silkworm rearers in Baramulla district, North Kashmir

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Abstract
Sericulture plays a vital role in rural livelihoods by providing sustainable employment opportunities, particularly for women. The present study examines the socio-economic challenges and opportunities faced by women silkworm rearers in Baramulla district of North Kashmir, with special emphasis on their participation in sericulture-based activities. An ex-post facto research design was adopted, and a total of 120 women silkworm rearers were selected from five sericulture zones using the proportionate allocation method. Data were collected through a structured and pre-tested interview schedule and analyzed using descriptive statistical tools such as frequency, percentage, mean, and standard deviation. The results revealed that the majority of respondents were middle-aged (70.84%), illiterate (61.67%), and possessed medium-sized landholdings (50.00%). Most women (62.50%) practiced agriculture along with sericulture as their primary occupation and earned a medium annual income ranging from ₹0.90 to 1.64 lakh (76.67%). The respondents exhibited medium levels of scientific orientation (81.67%), economic motivation (86.67%), and risk orientation (79.17%). However, access to information sources was limited, with 48.34% of respondents reporting low exposure. Despite this constraint, a considerable proportion maintained medium levels of extension contact (74.17%), indicating scope for strengthening extension-based interventions.
The study highlights the need for targeted efforts such as education, skill-based training, improved access to information, and enhanced extension support to strengthen women's participation in sericulture. These interventions can significantly contribute to women's economic empowerment and the sustainable development of the sericulture sector in the region.

Keywords: Socio-economic status; women sericulturists; motivation; extension contact; sericulture; sustainable development

Introduction
Sericulture, the art and science of rearing silkworms for silk production, is a significant agro-based, export-oriented industry that plays a crucial role in employment generation and poverty alleviation, particularly in rural economies. Globally recognized as the "Queen of Textiles," silk is highly valued for its quality and economic importance (Gangopadhyay, 2008; Rani, 2009) [9, 21]. Sericulture, the art and science of rearing silkworms for silk production, is a significant agro-based and export-oriented industry that plays a crucial role in employment generation and poverty alleviation, particularly in rural economies. Silk, often referred to as the "Queen of Textiles," is highly valued for its aesthetic, economic, and cultural importance (Gangopadhyay, 2008; Rani, 2009) [9, 21]. The sericulture sector contributes to multiple development goals, including poverty reduction, gender empowerment, environmental sustainability, and rural livelihood security. It offers a sustainable income-generating opportunity, especially for small and marginal farmers, as it requires relatively low investment and provides comparatively high returns. Several studies have reported that sericulture offers one of the highest benefit-cost ratios among agricultural enterprises, making it an attractive livelihood option in developing countries such as India (Malik, 2009) [15].
India is the second-largest producer of silk in the world after China, contributing approximately 41.40% of global silk production (Anonymous, 2023) [1]. During 2022-23, the country produced about 38,913 metric tonnes of raw silk. Major silk-producing states include Karnataka, Andhra Pradesh, West Bengal, Tamil Nadu, and Jammu & Kashmir, together

accounting for nearly 97% of total mulberry silk production (Bhat, 2014) [5]. Jammu and Kashmir occupies a unique position in Indian sericulture due to its favourable temperate climate, which is highly suitable for bivoltine silk production comparable to that of China and Japan (Anonymous, 2021) [3]. The region has about 2,850 hectares under mulberry cultivation, of which approximately 30.17% lies in the Kashmir division (Bhat, 2014) [5]. Despite this potential, sericulture in Jammu and Kashmir has experienced a gradual decline over the past few decades, largely due to competition from high-value horticultural and agricultural crops.

One of the most distinctive features of sericulture is its strong association with women's participation. The industry is highly labour-intensive and requires careful handling of silkworms, making it particularly suitable for women. Studies indicate that women contribute more than 53% of the total labour in sericulture operations, including mulberry cultivation, silkworm rearing, cocoon harvesting, and silk reeling (Gangopadhyay, 2008) [9]. Women's involvement in sericulture not only provides income but also promotes social empowerment and reduces gender disparities in rural areas (Lakshmanan & Devi, 2007) [14].

In Jammu and Kashmir, sericulture is practiced across 20 districts, with Baramulla being one of the major silk-producing districts. Baramulla covers an area of 4,190 km² and comprises 16 tehsils, 26 development blocks, and 543 villages. The district has 231 villages engaged in sericulture activities, with a total of 1,019 silkworm rearers, of whom only 167 are women (Anonymous, 2022) [2]. This low representation highlights the untapped potential of women's participation in the sector. Several socio-economic constraints such as limited access to quality silkworm seed, inadequate training, poor technical guidance, lack of market linkages, land fragmentation, and insufficient financial support continue to restrict women's effective participation in sericulture.

Despite these challenges, sericulture offers substantial opportunities for women in Baramulla. The Government of Jammu and Kashmir has introduced several support measures, including free mulberry plantation material, silkworm rearing kits, and cocoon drying facilities to enhance productivity and income levels (Anonymous, 2021) [3]. Furthermore, increasing demand for high-quality and organic silk in national and international markets presents promising prospects for the sector. With appropriate training, improved access to information, and institutional support, women silkworm rearers can significantly improve their socio-economic conditions.

The present study entitled "Socio-Economic Challenges and Opportunities in Sericulture: A Case Study of Women Silkworm Rearers in Baramulla District, North Kashmir" aims to assess the socio-economic profile, challenges, and opportunities of women engaged in sericulture. The study focuses on variables such as education, landholding, income, experience, access to information, extension contact, and adoption-related traits to understand how sericulture can serve as a sustainable livelihood option for rural women.

Material and Methods

The study was conducted in Baramulla district, the largest district of the Kashmir Valley, covering an area of 4,243 km² and comprising 231 sericulture-practicing villages. An ex-post facto research design was adopted to assess the socio-economic characteristics of women silkworm rearers.

A total sample of 120 women silkworm rearers was selected using the proportionate allocation sampling technique from five sericulture zones, namely Pattan, Tangmarg, Sopore, Uri, and Baramulla. Primary data were collected through a well-structured and pre-tested interview schedule developed in consultation with subject matter experts.

Twelve independent variables were studied, namely age, education, family size, landholding, occupation, annual income, experience in sericulture, sources of information, extension contact, risk orientation, economic motivation, and scientific orientation. These were examined in relation to two dependent variables: knowledge and adoption of sericulture technologies.

The collected data were analyzed using appropriate descriptive statistical tools such as frequency, percentage, mean, and standard deviation to draw meaningful inferences regarding the socio-economic status of the respondents.

Results and Discussion

Age

The data presented in Table 1 and Figure 1 indicate that the majority (70.84%) of women silkworm rearers belonged to the middle-age group (39-60 years), followed by 15.00% in the young age group (23-38 years) and 14.16% in the old age group (above 60 years). The dominance of the middle-aged group may be attributed to their greater experience, physical ability, and decision-making capacity. This group is generally more receptive to innovations and capable of adopting improved technologies. Similar findings were reported by Hadimani *et al*. (2017) [11] and Philip (2015) [20].

Table 1: Distribution of the respondents according to their age N=120

S. No.	Category	Frequency	Percentage
1	Young age	18	15.00
2	Middle age	85	70.84
3	Old age	17	14.16
Total		120	100.00
Mean= 49.40; S.D.= 11.33			

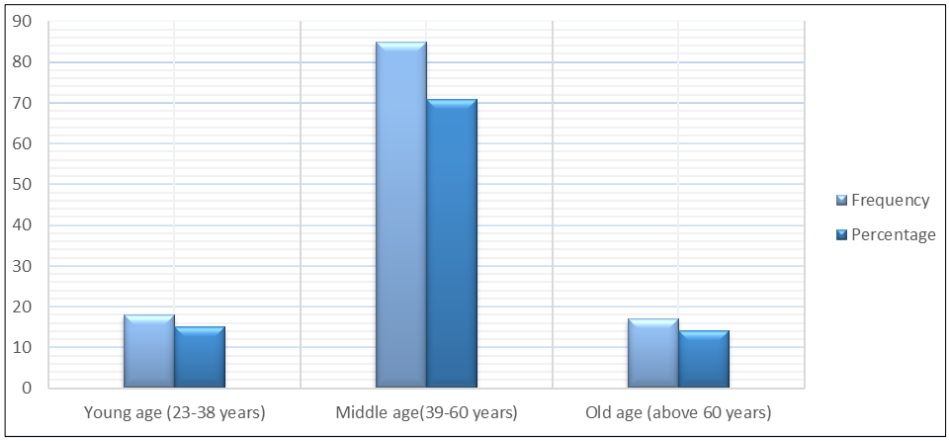

Fig 1: Distribution of the respondent according to their age

Education

The educational status of respondents (Table 2 and Figure 2) revealed that a majority (61.67%) were illiterate. This was followed by high school education (15.00%), higher secondary education (8.33%), primary education (7.50%), graduation (5.00%), and middle school education (2.50%). The high level of illiteracy may be attributed to limited access to schools in earlier decades, socio-cultural constraints, and lack of emphasis on female education. These findings are in agreement with Geetha (2010) [10], who also reported a high proportion of illiterate women among sericulture practitioners.

Table 2: Distribution of the respondents according to their education N=120

S. No.	Education level	Frequency	Percentage
1	Illiterate	74	61.67
2	Primary School	9	7.50
3	Middle School	3	2.50
4	High School	18	15.00
5	Higher Secondary	10	8.33
6	Graduation	6	5.00
	Total	**120**	**100.00**

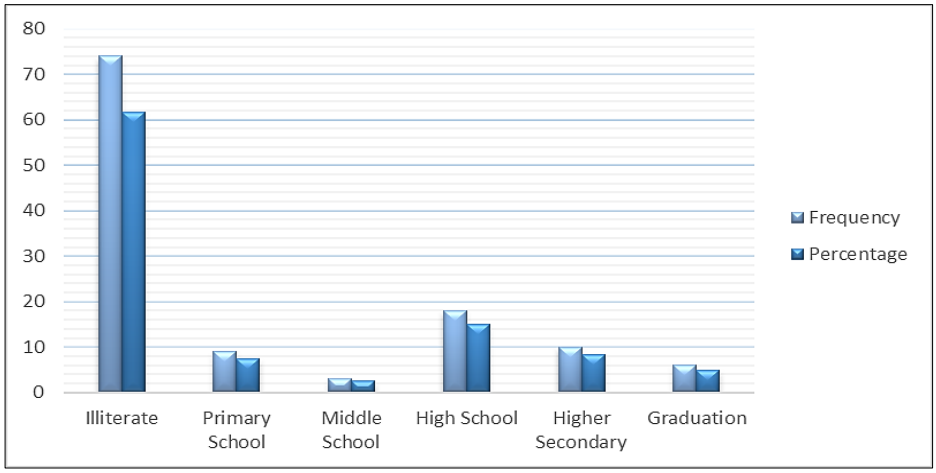

Fig 2: Distribution of the respondents according to their education

Family Size

Data presented in Table 3 and Figure 3 indicate that most respondents (70.84%) belonged to medium-sized families (6-9 members), followed by small families (15.83%) and large families (13.33%). The prevalence of medium-sized families reflects changing socio-economic conditions, increasing awareness of family planning, and rising costs of living. Similar observations were reported by Dhruw (2008) [8].

Table 3: Distribution of the respondents according to their family size N=120

S. No.	Category	Frequency	Percentage
1	Small (Up to 5 members)	19	15.83
2	Medium (6-9 members)	85	70.84
3	Large (Above 9 members)	16	13.33
	Total	120	100.00
Mean=7.308; S.D.=1.855			

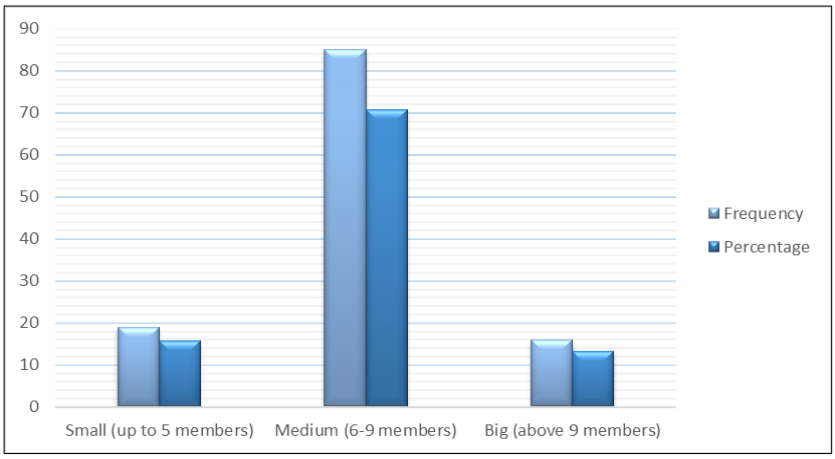

Fig 3: Distribution of the respondents according to their family size

Landholding

As shown in Table 4 and Figure 4, half of the respondents (50.00%) possessed medium landholdings (3-5 kanals), while 39.17% had small landholdings (up to 2 kanals) and only 10.83% owned large landholdings (above 5 kanals). This pattern reflects continuous land fragmentation due to generational division of land. These findings corroborate the results reported by Mir (2013).

Table 4: Distribution of the respondents according to their land holding N=120

S. No.	Land Holding	Frequency	Percentage
1	Small (1-2 Kanals)	47	39.17
2	Medium (3- 5 kanals)	60	50.00
3	Large (Above 5 kanals)	13	10.83
	Total	120	100.00
Mean=2.933; S.D=2.003			

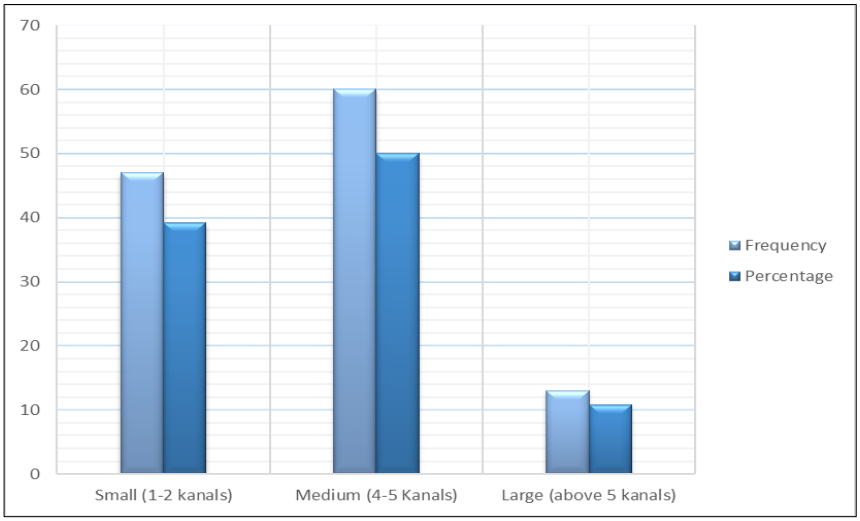

Fig 4: Distribution of the respondents according to their land holding

Occupation

The data in Table 5 and Figure 5 show that the majority of respondents (62.50%) practiced agriculture along with sericulture as their main occupation. This was followed by agriculture + sericulture + dairy (12.50%) and agriculture + sericulture + business (10.00%). A small proportion depended solely on sericulture (6.66%). The results indicate that sericulture functions largely as a supplementary livelihood activity alongside agriculture. Similar trends were reported by Geetha (2010) [10] and Hadimani *et al*. (2017) [11].

Table 5: Distribution of the respondents according to their occupation N=120

S. No.	Category	Frequency	Percentage
1	Sericulture	8	6.66
2	Agriculture + Sericulture	75	62.50
3	Agriculture + Sericulture + Dairy	15	12.50
4	Sericulture + Agriculture + Livestock	7	5.84
5	Sericulture + Horticulture	3	2.50
6	Agriculture + Sericulture + Business	12	10.00
	Total	120	100.00

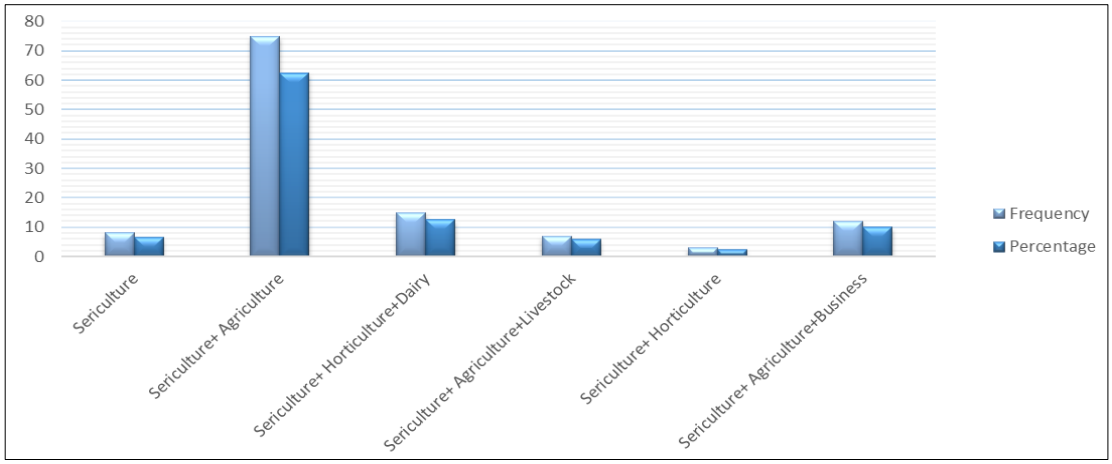

Fig 5: Distribution of the respondents according to their occupation

Annual income

Table 6 and Figure 6 indicate that 76.67% of respondents belonged to the medium income group (₹90,001-1,64,000), while 17.50% fell in the low-income group and only 5.83% in the high-income category. This income distribution reflects the dependence on agriculture-based livelihoods and limited diversification opportunities. Similar findings were reported by Dar *et al*. (2009) [6] and Hajam *et al*. (2021) [12].

Table 6: Distribution of the respondents according to their annual income N=120

S. No.	Category	Frequency	Percentage
1	Low (Rs 40000 - Rs 90000)	21	17.50
2	Medium (Rs 90001-164000)	92	76.67
3	High (Above Rs 164000)	07	05.83
	Total	120	100.00
Mean=112795.43 S. D=51463.46			

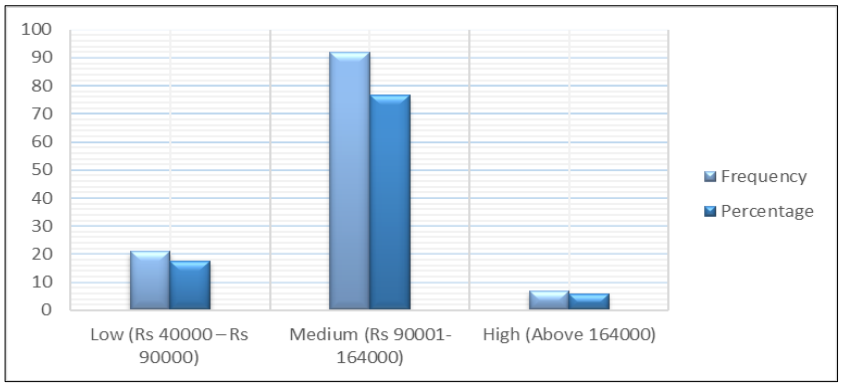

Fig 6: Distribution of the respondents according to their annual income

Experience in sericulture

The data presented in Table 7 and Figure 7 reveal that 60.83% of respondents had medium experience (9-28 years), followed by 20.00% with low experience and 19.17% with high experience. The predominance of medium experience corresponds with the age distribution of respondents and indicates sustained engagement in sericulture over time. These findings are in line with Baqual *et al*. (2014) and Hajam (2021) [12].

Table 7: Distribution of the respondents according to their experience in sericulture N=120

S. No.	Category	Frequency	Percentage
1.	Low (up to 8 years)	24	20.00
2.	Medium (9- 28 years)	73	60.83
3.	High (Above 28 years)	23	19.17
	Total	120	100.00
Mean=18.791; S.D. 10.075			

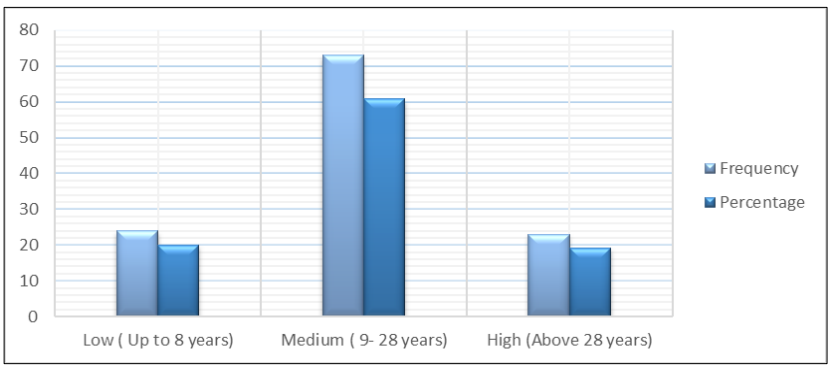

Fig 7: Distribution of the respondents according to their experience in sericulture

Sources of information

Table 8 and Figure 8 show that 48.34% of respondents had low exposure to information sources, 45.84% had medium exposure, and only 5.84% had high exposure. Limited literacy levels and poor access to print and digital media may explain this trend. Restricted access to information can adversely affect awareness and adoption of improved sericulture practices. Similar observations were reported by More (2000).

Table 8: Distribution of the respondents according to exposure to the sources of information N=120

S. No.	Category	Frequency	Percentage
1	Low	58	48.34
2	Medium	55	45.84
3	High	07	5.84
	Total	120	100.00
Mean=1.575; S.D. =0.603			

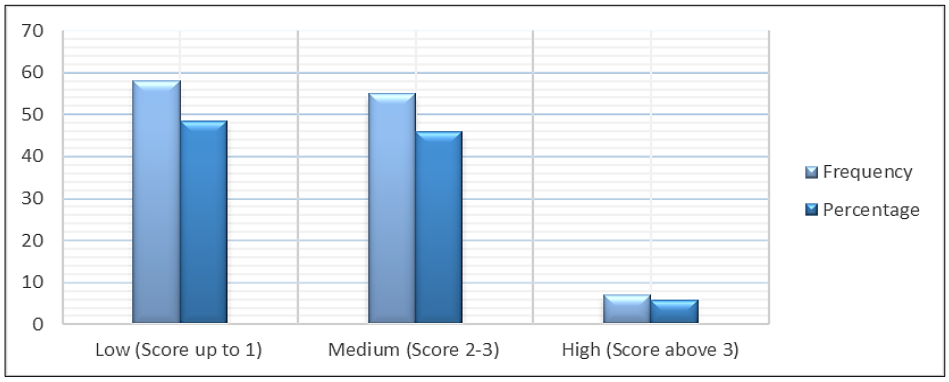

Fig 8: Distribution of the respondents according to exposure to the sources of information

Extension contact

The results in Table 9 and Figure 9 indicate that 74.17% of respondents had a medium level of extension contact, while 14.16% and 11.67% had low and high levels, respectively. Regular interactions with extension personnel, input dealers, and progressive farmers likely contributed to moderate extension exposure. These findings are consistent with those of Sunildutt and Chole (2002) [23] and Hadimani *et al*. (2017) [11].

Table 9: Distribution of the respondents according to their contact with extension workers N=120

S. No.	Category	Frequency	Percentage
1	Low	17	14.16
2	Medium	89	74.17
3	High	14	11.67
	Total	120	100.00
Mean =3.308; S.D=0.877			

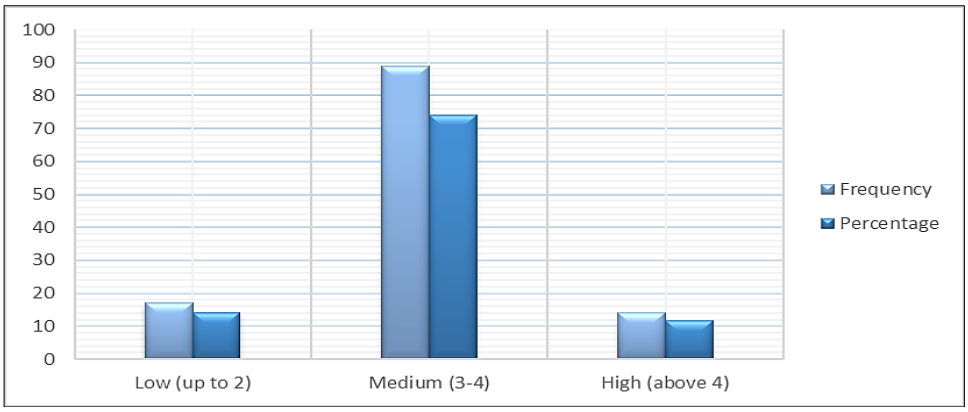

Fig 9: Distribution of the respondents according to their contact with extension workers

Scientific orientation

The data in Table 10 and Figure 10 show that the majority of respondents (81.67%) possessed a medium level of scientific orientation, followed by low (14.17%) and high (4.17%) levels. This suggests that while respondents are somewhat receptive to scientific practices, limitations in education and technical exposure restrict higher adoption levels. Similar results were reported by Hadimani *et al*. (2017) [11].

Table 10: Distribution of the respondents according to their scientific orientation N=120

S. No.	Category	Frequency	Percentage
1	Low	17	14.17
2	Medium	98	81.67
3	High	05	4.17
	Total	120	100.00
Mean = 12.25; S.D. = 1.696			

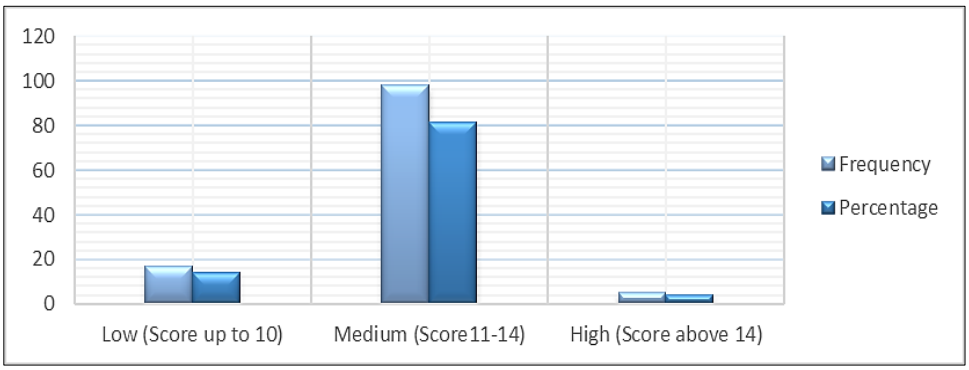

Fig 10: Distribution of the respondents according to their scientific orientation

Risk orientation

As presented in Table 11 and Figure 11, most respondents (79.17%) exhibited medium risk orientation, followed by low (17.50%) and high (3.33%) risk orientation. This may be attributed to their middle age, family responsibilities, and cautious approach toward adopting new practices. Comparable findings were reported by Nataraju (2012) and Dhepe (2014)

Table 11: Distribution of the respondents according to their risk orientation. N=120

S. No.	Category	Frequency	Per cent
1	Low	21	17.50
2	Medium	95	79.17
3	High	4	3.33
	Total	120	100.00
Mean = 8.558; S.D. = 1.186			

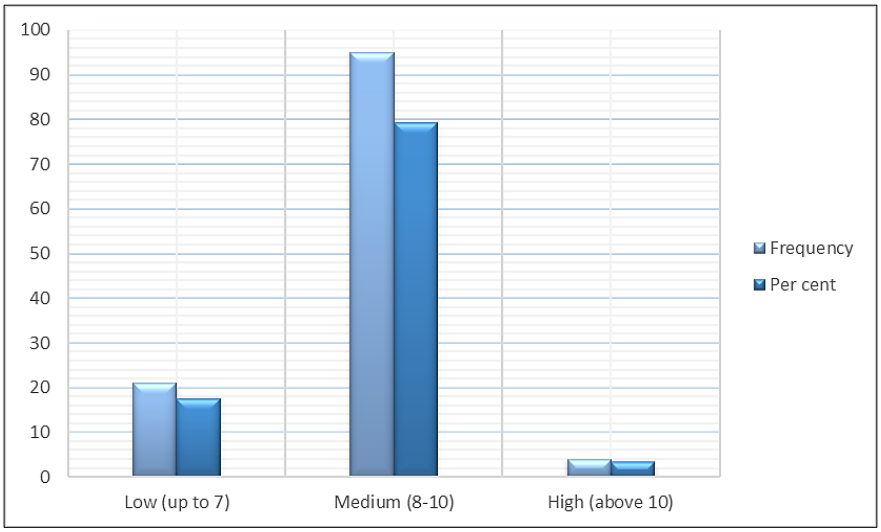

Fig 11: Distribution of respondents on the basis of risk orientation

Economic motivation

Table 12 and Figure 12 reveal that 86.67% of respondents had medium economic motivation, followed by 10.00% with high and 3.33% with low motivation. This indicates a strong desire among women to improve their economic condition despite existing constraints. Similar trends were observed by Siddalingayya (2011) [22] and Mandlik (2012) [16].

Table 12: Distribution of the respondents according to their economic motivation N=120

S. No.	Category	Frequency	Per cent
1	Low	12	10.00
2	Medium	104	86.67
3	High	04	3.33
	Total	120	100.00
Mean = 8.941; S.D. = 1.317			

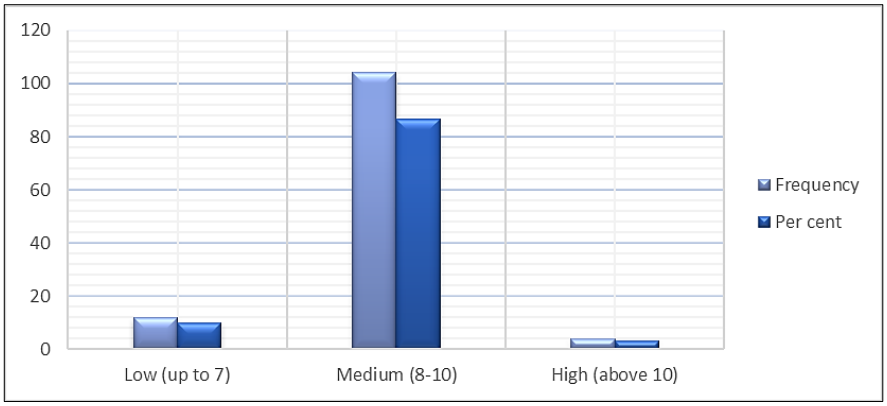

Fig 12: Distribution of respondents on the basis of economic motivation

Conclusion

The study provides comprehensive insights into the socio-economic profile of women silkworm rearers in Baramulla district of North Kashmir and highlights both the challenges and opportunities within the sector. Most women engaged in sericulture are middle-aged, illiterate, and belong to medium-sized families with moderate landholdings. Although they exhibit medium levels of scientific orientation, economic motivation, and risk-taking ability, their access to information sources remains limited. Despite these constraints, moderate extension contact and diversified livelihood strategies indicate significant potential for growth.

The findings emphasize the need for focused interventions such as adult education programs, skill-based training, strengthened extension services, and improved access to information and institutional support. Enhancing these components will not only increase productivity and income from sericulture but also promote women's empowerment and sustainable development of the sericulture sector in the region.

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