Sustainable livelihood & Employment Opportunities in Sericultre in India

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ABSTRACT

Sericulture is agro-based industry that primarily involves the cultivation of mulberry trees, rearing of silkworms, and production of silk. India is second largest producer of silk after China and contributes 18% of the world production of raw silk. It presents a variety of employment opportunities across different stages of its production cycle.The scope of employment in sericulture is vast, offering numerous opportunities for individuals with diverse skills and interests. From hands-on farming and technical roles to creative and business-oriented positions, the sericulture industry supports a wide array of careers. It provides sustainable livelihoods. It generates sustainable income sources, reducing rural-urban migration. Sericulture contributes to the economy through export earnings and domestic sales and hence brings economic development. It supports traditional silk weaving and craft practices helping in cultural preservation. As mulberry plants and other plants are required for silkworm therefore sericulture encourages the cultivation of mulberry and other plants, which can positively impact local biodiversity. It plays a significant role in improving the economy, women's empowerment, and rural development. By integrating sericulture with other agricultural practices, farmers can diversify their income sources and achieve greater economic stability. The industry also supports numerous small and medium enterprises (SMEs) involved in processing, weaving, and marketing silk products. The future of sericulture looks promising, with several avenues for growth and innovation. Integrating modern agricultural practices, enhancing genetic research, and expanding the use of sericulture by-products can contribute to the industry's sustainability. This review explores the various dimensions of sericulture, including its biological foundations, employments opportunities and socio-economic impacts, challenges and future prospects.

KEYWORDS

Sericulture, Sustainable livelihood, Economic development, Enterprise

INTRODUCTION

Sericulture, the cultivation of silk-producing silkworms and the production of silk, offers various employment opportunities across different stages of the silk production process. India is the only country in the world which produces all varieties of silk namely Mulberry silkworm, Tassar silkworm, Muga silkworm, Eri silkworm and Oak silkworm. India is second largest producer of silk after China and contributes 18% of the world production of raw silk. About 95% of Muga silk in Assam and 70% of Tassar silk in Chhattisgarh is produced. North Indian states of India contribute about 98% of Eri and 92% of Muga silk. It is not just limited to rearing of silkworm but it also provides various kinds of opportunities of diverse work for both men and women. It generates employment opportunities in two major categories, one is Direct employment in which people are involved in processes like Mulberry cultivation, leaf harvesting and silk worm rearing. Other is Indirect employment in which people are engaged with activities like reeling, twisting, weaving, printing and dyeing, finishing and silk waste processing. It can provide employment to educated unemployed youth as well to rural women. In rural areas, sericulture provides livelihood opportunities for numerous individuals, particularly those in economically marginalized communities. Sericulture is one of the most labor intensive sectors of economy. Sericulture leads to cultivation of mulberry plants and helps in conservation of biodiversity, hence provides sustainable livelihood .

With proper education and technical guidance, local people can be trained for eco-friendly, silkworm rearing technology, mountages, spinning, harvesting and storage of cocoons. Many facets of the silkworm farming sector, such as mulberry cultivation, silkworm breeding, silkworm rearing, silk wrapping and weaving, and the gathering and processing of by-products, create jobs on a large scale and serve as a source of income for rural and tribal populations (Gregory, 1994). Sericulture employs a large number of people, helps in reducing poverty and generates employment from unskilled farm laborers to skilled craftspeople in the rural area (Savitri et al., 2013). It plays an important role in employment generation and development of the rural economy of our country. India becomes a major contributor in international trade of silk. This trade can generate more job opportunities and self employment in rural areas.

OBJECTIVE

- To study the diversity of Silk moth
- To analyze the status and scope of sericulture in India.
- To explore opportunities of employment in rural area in our country.

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METHODOLOGY

This is review article and is based on secondary sources of data. The data has been collected from Central Silk Board (C.S.B.) Annual Reports, Mysore, Karnataka. After the collection of data for showing the results computer cartography has been used for showing the different bar diagram, map and tables etc.

DISCUSSION

In Sericulture basic necessities are land, mulberry foliage, silkworm rearing home, rearing equipments, silkworm eggs and farm equipments. Success in sericulture totally depends on technical knowledge regarding mulberry plantation, garden maintenance and silkworm rearing. In India mainly four types of silk are produced by four types of silkmoths. Classification of different types of silkmoths and types of silk are tabulated in the table 1.

Classification **Kingdom :** Animalia **Phylum :** Arthropoda **Class :** Insecta **Order** : Lepidoptera			
Family :	**Genus:**	**Type of silk**	**Plant habitat**
Bombycidae	Bombyx mori	Mulberry silkworm (White or Creamy colour)	Mulberry plant (Morus Spp.)
Saturnidae	Antheraea pernyi	Oak tasar (Temperate tasar)	Quercus Spp
Saturnidae	Antheraea mylitta	Tropical tasar (Coperish in colour)	Arjun (Terminalia arjuna)
Saturnidae	Samia cynthia	Eri silk (White colour)	Castor (Ricinus cummunis)
Saturnidae	Antheraea assamensis	Muga silk (Golden yellow colour)	Som (Bombycina)

Table:1.Classification of silkmoth

1. Mulberry Silkworm

Bombyxmori L., a kind of silkworm feeds upon the leaves of the mulberry plant to produce mulberry silk. Major mulberry silk producing states in India are Karnataka, Andhra Pradesh, West Bengal, Tamil Nadu, and Jammu and Kashmir which contribute 92% of the nation's mulberry raw silk. Adult are roughly 2.5 cm length, creamy white in color, have weak wings incapable of supporting flight. Life cycle of mulberry silkworm completes in 45-55 days, consist of stages egg, larva, pupa cocoon, adult. Egg stages is lasting for 9-10 days , larval24-28 days , pupal stage 8-10 days and moth stages 3-4 days . **Mulberry silk** are used for clothing such as saree, suits, bed sheets and fashion garments

2. Tasar Silkworm

Silkworm Antheraeamylitta produces Tasar silk . It feeds the plants Sal (Shorea robusta) , Ber (Ziziphusujuba) , Asan (Termenalia arjuna) and Arjun (Terminalia tamantosa) .Tasar silkworms are entirely wild and therefore cultivation may be avoided. The male are smaller and brick-colored, while the female is larger yellowish color and has an obvious eye spot on its wing. Tasar silk is mostly produced in Maharashtra, West Bengal, and Andhra Pradesh also in the states of Jharkhand, Chhattisgarh, and Orissa. In India tribal communities are involved in on their tasar tradition.

3. Oak Tasar Silkworm

Superior kind of tasar is produced by silkworm, Antheraea pernyi J. They feed upon plants of oak. Main contributors of oak tasar silk are Uttar Pradesh, Assam, Himachal Pradesh, Meghalaya, Manipur and Jammu & Kashmir are. The majority of oak tasar silk is produced globally by China.

4. Eri Silkworms

The farmed silkworm samia ricini, which mostly consumes castor plants, produces eri silk. The male of Eri silkworm is smaller than the female, and both sexes have wooly white abdomens. Adults are brown in color or have black and green wings with white crescent patterns. These are multivoltine and undergo 5–6 generations every year. Eri silkworms have a varying longevity of 44 days in the summer and 85 days in the winter. It may also be found in Assam and the north-eastern states of India.West Bengal, Orissa, and Bihar. **Eri silk** is mostly used in weaving in India's Northeast regions, it has great potential in knitting , crochet and embroidery.

5. **Muga Silkworms**

The semi-domesticated multivoltine silkworm Antheraea assamens is spawns non feeding eggs after copulation, which are non-feeding and expire in 7–12 days. Male moths have dark brown and copper-colored wings and bodies, while females have yellowish to brown wings and bodies. Two pairs of wings have eye spots. India is the rightful owner of this golden-yellow silk. The Muga silk is unique to the state of Assam which make Sarees, mekhakas, and chaddars, among other items.

Present status of Sericulture in India

Worldwide India is the second largest producer of silk. In year 2020-21 record of four varieties of silk produced was as mulberry accounted for 70.72%, Tasar 8.02% , Eri 20.55% and Muga 0.71% of total raw silk production .Sericulture industry provides employment to approximately 8 million person in rural and semi urban areas in India. The sericulture sector in India produces a wide range of silk varieties, including Mulberry, Tasar, Eri, and Muga in different climates (Chand et al., 2023). According to the Central Silk

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Board report 2015, all five kinds of commercial silks, namely mulberry, tropical tasar, oak tasar, eri, and muga are produced in India. Major silk producting states in the country are Andra Pradesh, Assam , Bihar, Gujrat, Jammu Kashmir, Tamilnadu, West Bengal, Chhattisgarh, Maharashtra (Fig:1).

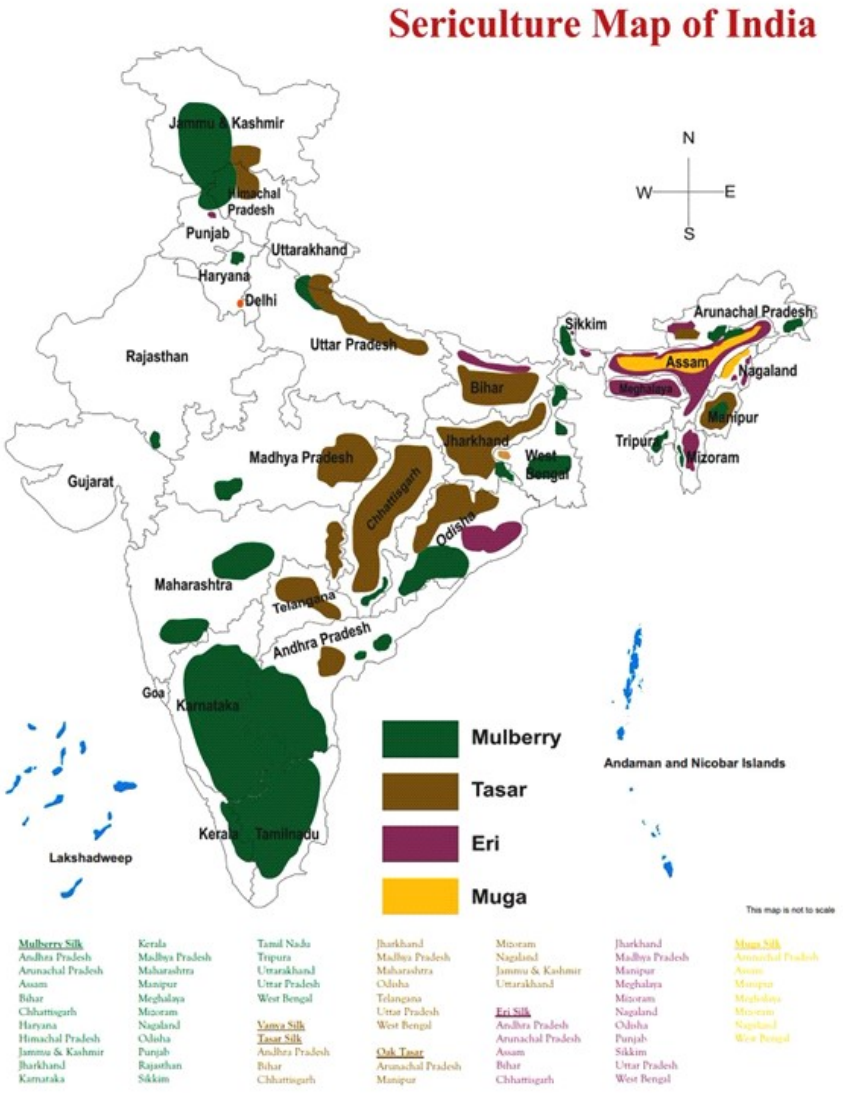

Fig:1: India map source: Central Silk Board Ministry of Textiles

Main leading raw silk producer during 2017-2022 was Karnataka. Andhra Pradesh, Assam, Tamil Nadu, West Bengal, Meghalaya showed constant production for 5 years. Sikkim showed the least production of raw silk. Remaining states showed decreasing graph of raw silk production. Maharashtra state showed increasing trend of silk production. The total silk production in India during 2021-2022 was 34,903 MT, an increase of 3.4% mulberry production being the largest among other types of silk. The main silk-producing states are Andhra Pradesh, Assam, Bihar, Gujarat, Jammu & Kashmir, Karnataka, Chhattisgarh, Maharashtra, Tamil Nadu, Uttar Pradesh, and West Bengal. In year 2021-22 Karnataka produced 32% of the total silk production in the country, followed by Andhra Pradesh of 25% in the overall silk production(Table:2).

For overall development of sericulture and silk industry in India apex body is formed known as Central Silk Board (CSB), Bangalore under the Ministry of Textiles, Govt. of India. The Board promotes development of the silk industry assist and encouraging scientific, technological and economic research. Works for improvement of mulberry cultivation, production and distribution of healthy silkworm seed, production of quality raw silk and promotion of silk market etc. For the development and growth of the silk industry in India, the government has implemented several research and development training. The focus to develop new technologist and to enhance the connectivity between scientist, experts and developers. We can produce transgenic silkworms with higher cocoon quality and quantity through advanced methods including gene therapy, gene editing, transgenic technology, and using silk as a material in the pharmaceutical and medical industries, etc. (Sharma et al., 2022). Government of India has taken initiative for the promotion of sericulture. For the development of silk industry many schemes such as the Sericulture Development in North-Eastern States (NERTPS), Tribal Sub-Plan (TSP), Silk Samagra and Scheduled Caste Sub-Plan (SCSP) are running. One of the Integrated Scheme for Development of Silk Industry (ISDSI) is known as Silk Samagra. In year 2021-22 the silk fabrics and silk readymade garments exports share was 45.3%, and 36.3%, silk waste (11.3%), silk carpets (4.3%), and natural silk yarn (2.8%) (Table;2; Fig:2).

S.No	State	Yr 2019-2020	Yr2020-2021	Yr2021- 2022	Yr 2023
1.	Karnataka	11143	11292	11291	12750 target
2.	Andhra Pradesh	7962	8422	8834	9530
3.	Assam	5026	5450	5700	-
4.	Tamil Nadu	2072	1834	2373	2600

S.No	State	Yr 2019-2020	Yr2020-2021	Yr2021- 2022	Yr 2023
5.	West Bengal	2394	872	1632	1776
6.	Meghalaya	1192	1213	1234	1014
7.	Jharkhand	2402	2185	1052	2902
8.	Maharashtra	428	428	523	414
9.	Manipur	507	327	462	328
10.	Telangana	297	309	404	-
11.	Uttar Pradesh	309	316	355	-
12.	Mizoram	104	43	315	-
13.	Chhattisgarh	480	300	224	-
14.	Tripura	111	86	113	140

Table:2 : Statista Report 2023. https://www.statista.com/statistics/622953/raw-silk-production-by-state-india.

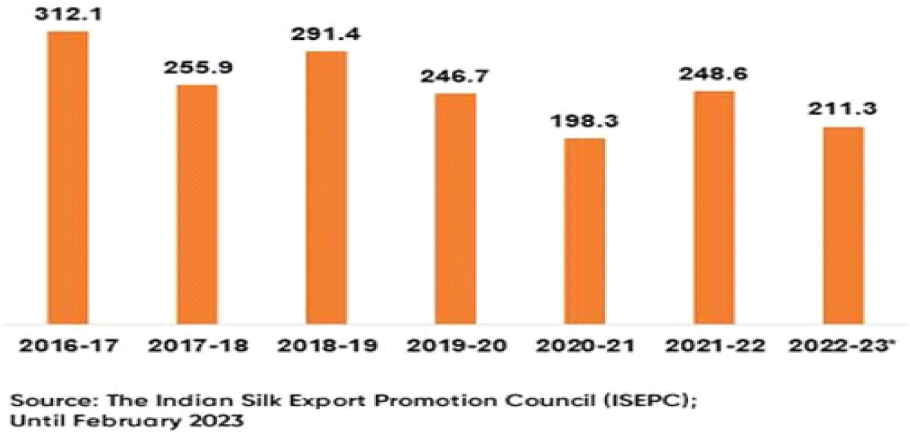

Fig:2..Silk Export In US million

1. Sericulture in Karnataka

In Karnataka sericulture was first established by Tippu Ramanagara city of karnattaka is famous for sericulture and toys. Ramanagra is the largest market for silk cocoon in Asia. Karnataka is known's as the "land of sericulture" accounts total two third of the country output and provides employments to about10.7 lakh people. Raw silk produced has now increased to 11592 MTs in 2018 -2019. Central Silk Board is established in 1949 by Ministry of Textiles of Government of India having headquarter in Banglore. Which governs development of sericulture industry in India.

2. Sericulture in Andhra Pradesh

Andhra Pradesh is the second largest producer of silk in India .Gadwal silk sarees are another popular type of silk sarees in India. Dharmavaram city of the Andra Pradesh is famous for the handloom weaving. The most prevalent form of silk made in Andra Pradesh is mulberry silk. .Sericulture department of this state has promoted mulberry plantations in 935 villager out of which some are small farmers, marginal farmers,and few are big farmers.

3. Sericulture in Maharashtra State

In Maharashtra production of Mulberry and Tasar silk has increased from 2004-05 to 2013-14 (Nimgare et al., 2017). Another study by Pathare and Hiware (2017)documented participation of women in sericulture activities of Ahmednagar district. Sericulture plays a crucial role in empowerment of women and farmers of Ahmednagar district.

Job Opportunities:

Sericulture promises many job opportunities to rural people as well as to women. It can provide sustainable livelihood with less investment. One can generate income by direct involvement in culturing and rearing activities and can set up the nursery of host plants. Indirect involvement in other facilities provided for rearing of silkmoths like productions of bio-fertilizers applied to mulberry garden , productions of compost , production of bio-control agents to protect mulberry as well as silkworm crops from natural enemies etc. One can start productions of rearing equipments -mountages used in silkworm cocoon crop.

There are employment opportunities in Pre –cocoon activity and Post cocoon activity.

a) Reeling is process of extracting raw silk thread from cocoons.

b) Twisting is applicable for strengthening .

c) Weaving is process of manufacturing fabrics.

d) Printing is used for designing on plain fabrics.

e) Dyeing is done for coloring the thread /cloth.

f) Computer aided designing helps in simulated design which can be weaved.

On large scale Sericulture can be set up as entrepreneurship. Many roles in this business are in demand like Marketing Manager, Technical field assistants, Sericulture Instructor, Consultant, Inspector, Farm Manager. The industry also supports numerous small and medium enterprises (SMEs) involved in processing, weaving, and marketing silk products. The future of sericulture looks promising, with several avenues for growth and innovation. Integrating modern agricultural practices, enhancing genetic research, and expanding the use of sericulture by-products can contribute to the industry's sustainability.

In India employment generation in silk industry has reached to 8.7 million persons in year 2021-22.

Challenges in Indian sericulture industry:

1. Recurring attack of the pebrine disease.
2. Most of people face difficulties in getting quality raw material to start.
3. Other problem are price fluctuation, use of outdated technology, unscientific reeling and weaving technique, low production of bivoltine seeds.
4. Some silkworm varieties are highly susceptible to various pathogens.
5. Productivity of the mulberry crop may decrease due to unfavorable conditions.

CONCLUSION

It can provide employment to educated unemployed youth as well to rural women. In rural areas, sericulture provides livelihood opportunities for numerous individuals, particularly those in economically marginalized communities. Sericulture is one of the prominent enterprises, which provides full time employment to the entire family, generating income and improving standard of living. Sericulture involves less maintenance and huge returns. Individuals can start their own sericulture businesses, such as sericulture farms, silk processing units, or silk product manufacturing. Overall, sericulture provides a diverse range of employment opportunities, from traditional farming practices to modern research and entrepreneurship, contributing to the silk industry's growth and sustainability. The present paper explores the possible employments opportunities in the fields of sericulture.

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