

## Role of Sericulture in the Indian Economy

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www.jrasb.com || Vol. 3 No. 4 (2024): August Issue

Received: 28-07-2024

Revised: 16-08-2024

Accepted: 31-08-2024

### ABSTRACT

Sericulture, often known as silk farming, involves raising silkworms to make silk. Out of the five states that contribute to the majority of India's silk production—Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal, and Jammu & Kashmir - 98.5% comes from mulberry sericulture. Silk plays a vital role in Indian culture and tradition, with a rich history spanning over five millennia. Sericulture, especially in Karnataka, supports farmers' livelihoods and has significant economic potential. However, climate change poses a serious threat to global ecosystems, endangering species and affecting industries like sericulture. The Author uses the study variables for their study and also questionnaires, and statistical tools like SPSS and Excel for data presentation and calculation respectively also used statistical techniques like, Factor Analysis, Descriptive analysis, and Relatively Analysis. Sericulture enhances income, crop diversification, sustainability, and land use efficiency, supported by government policies and training. Sericulture is vital to India's rural development, job creation, and exports. It supports millions of rural households, especially women and marginalized communities, by generating consistent income. As one of the world's top silk producers, India benefits from government-backed sustainable practices, making sericulture crucial to its economy.

**Keywords-** Sericulture, Indian Economy, Silk Production, Agricultural Diversification, Sericulture Practices, Foreign Exchange Earnings, Economic Contributions.

## I. INTRODUCTION

Sericulture, often known as silk farming, involves raising silkworms to make silk. Among the several silkworm species utilized for commercial purposes, the domestic silk moth caterpillar has received the greatest attention and research. Because most of these silk moths have been rendered flightless and defenseless against predators by selective breeding, they are no longer found in the wild. Some estimate that silk production in China dates back to the Neolithic era. Many nations, including Brazil, China, France, Russia, India, Italy, Japan, Korea, and Thailand, have seen sericulture grow into a significant cottage industry. Two of the world's largest producers, India and China, account for about 60% of yearly output.

### 1.1 Process of Silk Production

Two salivary glands in the worms' heads release the protein fibroin, and a gum called sericin cements the

filaments together to form the silk. The cocoons are prepared for reeling by removing the sericin and soaking them in hot water, which releases the silk threads. The procedure for removing gums is called degumming. The pupa of the silk moth is also killed when submerged in hot water. The process of "throwing" single filaments together forms a thread, which is then dragged under tension via multiple guides and wound into reels. The amount and direction of twisting determine the yarn produced by this throwing procedure. See silk noil for an example of spun yarn made from plied threads. The raw silk is then packaged based on its quality after drying.

Adopting an integrated farming system (IFS) is necessary to reduce risk from biotic and abiotic stresses, meet the increasing demand for food, fiber, and fuel, increase income, employment, standard of living, and sustainability; and address the decline in agricultural growth rate, productivity, food production, net cultivable area, groundwater table, and farm income caused by

rising costs of production, environmental pollution, and widespread migration of farm laborers.

### 1.2 Silk growth in India

Out of the five states that contribute to the majority of India's silk production—Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal, and Jammu & Kashmir—98.5% comes from mulberry sericulture. According to Qadri et al. (2010), India needed around 27,005 metric tonnes of raw silk but only managed to produce 19,696 metric tonnes, with the remaining 8,000-9,000 metric tons coming from China. Silk products are currently enjoying a surge in popularity in industrialized nations. The shift from sericulture to manufacturing is a direct outcome of the product's strong demand on international markets and its significance in developing nations' ability to generate foreign currency.

For people of all socioeconomic backgrounds living in rural areas, sericulture offers a sustainable source of income growth that can boost household and per capita income right away (Giacomin et al., 2017; Gangopadhyay, 2008). Tourists and the silk trade in China, Brazil, and Mysore may all benefit from an eco-friendly vacation program. According to Armito et al. (2014) and Barcelos et al. (2020), it supports the arts and crafts industry and encourages high-quality, innovative products. Evidence from many studies suggests that mulberries may contain compounds with antibacterial, anti-inflammatory, antioxidant, antitumor, and anticancer properties (Singhal et al., 2010, Wang et al., 2013, Yuan and Zhao, 2017, Grzekowiak et al., 2022). So, it's fair to say it's a plant that can fulfill needs without compromising those of the generations to come. International Sericulture Commission 2019 reports that such programs help local economies, and, in the case of South Asia, Latin America, and Africa, help promote the region's natural assets while increasing tourism, which in turn generates more job opportunities.

## II. LITERATURE REVIEW

**Savithri, et. al (2013)** examined that Silk is an integral part of Indian culture and customs. It is deeply ingrained in Indian tradition and culture. Producing silk is an art and science known as sericulture. It has been around since the second century B.C., making it one of India's oldest industries. More than 70% of the population in India relies on agriculture and related farm operations for their livelihood, hence the success of these industries is crucial to the country's economy. Most Indians still reside in rural areas. Because of its roots in agriculture, sericulture is well-suited to India's rural structure and plays a pivotal role in determining the economic fate of rural residents.

**Bharathi, D. (2016)** cleared that with a 14.7% share of the world's raw silk production, India is second only to China in terms of silk production. One of the regalest fibers, silk is proteinaceous. The silkworm *Bombyx mori*, also known as the mulberry silkworm, is

the primary source of commercial silk. In sericulture, food plants are cultivated, silkworms are reared, silk is reeled, twisted, dyed, wove, etc. It is an agro-based rural cottage enterprise. Giving 6817,000 people in India a steady source of income. The sericulture sector generates a tremendous amount of waste and pollution. In order to achieve ecological security, add value, and create jobs, it requires intelligent management. Each year, the industry produces 16957 MTs of mulberry raw silk, consumes food plants in 179 thousand hectares spread across 51 thousand villages, generates 125 thousand tonnes of silk cocoons, and uses 24 crore silkworm seed.

**Naik, (2017)** said not being confined to the traditional sericulture sites is a reflection of both the economic potential and popularity of sericulture. Uzbekistan is one of many emerging and labor-rich countries that rely heavily on sericulture for employment, income, and foreign currency. Having said that, the point of this piece was to draw attention to the expansion and volatility of Uzbekistan's silk industry. Studied geographic export maps of raw silk across the world. To further deepen economic reforms in this sphere, the silk industry undertook structural reforms after Uzbekistan gained independence. As a result, they may modernize and produce new textiles, increase the volume and broaden the range of completed goods that are competitive in the world market, and create favorable conditions for foreign investment in the silk sector.

**Altman, & Farrell, (2022)** evaluated over five millennia, sericulture, the art of silk manufacture has a rich history. Beginning with the cultivation of mulberry trees—which have numerous uses—including the manufacture of silkworm food—the sericulture sector supports health, economic development, and jobs. The end result of sericulture is both high-protein food for people and animals and high-quality silk thread. This is dependent upon one of the most adaptable plants in the world, which has many other uses beyond just improving human health, such as preserving soil. With careful supply chain management, sericulture can be an incredibly environmentally friendly enterprise from start to finish. Silk is a naturally occurring polymer called poly-fibroin that possesses the adaptability of plastic and the benefit of being biodegradable.

**Dewangan, (2013)** stated that the sericulture and silk industries have great potential to provide livelihoods. With its minimal investment, short gestation period, high employment potential, and highly lucrative return, sericulture has become the most important cash crop. It fits in perfectly with the Tribal economy, which is based on agriculture. Perfect for everyone, whether they're a large-scale farmer or a landless person, young or old, male or female. Contains straightforward technology that is simple to learn and implement. Rural and semi-urban communities have benefited economically and socially from sericulture, which has attracted many people from lower socioeconomic backgrounds. This study delves into the ways in which

sericulture provides indigenous communities with options for subsistence. Sericulture is characterized by low input and high output, according to the research. Some recommendations to enhance sericulture's long-term viability are included in the study's conclusion.

**Girish, et. al. (2020)** evaluated that Farmers' livelihoods are greatly enhanced by sericulture and dairy farming, especially in the state of Karnataka. The farmers are guaranteed an income and gainful employment as a result. Research shows that weaker members of rural communities have better chances of improving farm revenue and employment when dairy businesses are merged with other businesses that use scientific management. Since Karnataka is the top silk producer in India and the eleventh milkiest state in the country, it was the natural choice to host the research. For this study, two districts—Kolar and Chikkaballapura—were chosen. Two blocks were chosen at random from each district. Fifteen respondents were chosen at random from each of the three villages that were chosen from each block. So, for the study, a grand total of 180 participants were chosen.

**Ram, et. al. (2016)** explored that global ecosystem and the survival of many species are in jeopardy due to climate change. While the precise impact of climate change on soil health and the sericulture sector remains uncertain, various hypotheses have been advanced to explain this phenomenon. According to the projections made by several Indian researchers, the buildup of anthropogenic greenhouse gases in the atmosphere could cause temperatures across the country to rise by half a degree to four degrees Celsius in the coming decades. This, in turn, could have a significant impact on sericulture in the temperate regions of the country and only a mild, positive influence in the tropical regions. Sericulture in tropical regions like Andhra Pradesh, Karnataka, Tamil Nadu, West Bengal, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand, and Assam will be hit hard, while the sub-Himalayan region of northeastern India and Jammu and Kashmir will see small to marginal losses.

**Ssemugenze, et. al (2021)** assessed that the sericulture industry relies on the worldwide rearing and exploitation of silkworms, a crucial primary producing insect species. Employment, income, economic growth, ecological and environmental values, agricultural integration, and environmental protection all contribute to a better quality of life and betterment of society. Production of mulberries, leaf and root harvesting, eggs, silkworms, and post-cocoon handling technologies (such as drying and harvesting the cocoon, winding the silk, doubling it, twisting it, warping it, weaving it, printing and designing it, finishing it, and processing silk waste) directly employ people in sericulture, while traders of silk products, builders of grainage, operators of silk processing machinery, and marketers of the finished products employ people indirectly.

**Taufique, M., & Hoque, M. A. (2021)** studied that sericulture is a labor-intensive rural cottage industry that is rooted on agriculture. According to the research, in 2015–16, India produced 28523 metric tonnes of raw silk. All of the information used in the study came from secondary sources, specifically the Central Silk Board in Mysore, Karnataka. They are second in the world for sericulture production, right after China. "Queen of Textile" is another name for sericulture. In India, the states of Karnataka, Tamil Nadu, Andhra Pradesh, West Bengal, Assam, and Jammu and Kashmir are significant sericulture-raising regions. Simultaneously, the state encounters several challenges, such as significant price fluctuations, a shortage of storage facilities, an inadequate market, inadequate financial backing, etc. India has excellent potential for sericulture.

**Rajesh, G. K., & Muchie, M. (2022)** examined that most of the impoverished people still live-in rural areas, alleviating rural poverty remains a top priority for emerging nations like India. For instance, according to the World Bank, over 70% of the world's impoverished reside in rural regions. Creating jobs in rural areas is one of the main approaches that have been taken so far to deal with this issue. As a labor-intensive rural agro-based economy, this sector can also play a significant role in preventing rural-to-urban migration. This report offers a comprehensive overview of the sericulture sector in India, including its current state, developments, global position, and scientific and technological accomplishments. To design policies and strategies for socio-economic development, this study would be useful in identifying the opportunities, threats, and strengths of India's sericulture business.

### **2.1 Objective of the study:-**

To assess the economic contribution of sericulture to the livelihoods of rural communities in India.

To analyze the impact of sericulture on agricultural diversification and sustainability in India.

To examine the influence of government policies and support programs on the growth and development of the sericulture industry in India.

### **2.2 Hypothesis of the study**

**H1-** There is a significant impact of the economic contribution of sericulture to the livelihoods of rural communities in India.

**H0-** There is no significant impact of the economic contribution of sericulture to the livelihoods of rural communities in India.

**H2-** There is a significant impact of the impact of sericulture on agricultural diversification and sustainability in India.

**H0-** There is no significant impact of the impact of sericulture on agricultural diversification and sustainability in India.

**H3-** There is a significant impact of the influence of government policies and support programs on the growth and development of the sericulture industry in India.

**H0-** There is no significant impact of the influence of government policies and support programs on the growth and development of the sericulture industry in India.

### III. METHODOLOGY

#### 3.1 Variables of the study

**1. Sericulture-** Employment, revenue, and cultural importance have all been greatly aided by sericulture in India's economy (Bharathi, 2016, Bukhari, 2019, Jalba & H. C. 2016). Women and members of economically disadvantaged groups make up a large portion of the sericulture workforce, which employs about 8.7 million people in semi-urban and rural regions. With an estimated eleven man-days of labor required to create a kilogram of mulberry silk in its raw form, sericulture is another source of year-round employment. One of the best ways to get your money's worth is to grow sericulture crops instead of cash crops like wheat, paddy, or maize. Depending on the silk type and the area beneath the host plants, net revenues might range from 12,000 to 70,000 rupees per annum. Since the 15th century, India has been a major player in the silk trade. The country has risen to the top of the silk industry because of its varied silk clothing, which showcase local traits. Because it requires basic, easily understood technology, sericulture is accessible to all demographics.

**2. Silk production-** After producing 34,903 metric tons in 2021–2022, and 33,770 metric tons in 2020–2021, India increased its silk production to 36,582 metric tons in 2022–2023 (POPESCU. 2024, Dhakal. 2024) . Silk output is falling short of domestic demand, which may be attributable to the country's heightened economic activity during the COVID-19 pandemic. Mulberry, eri, tasar, and muga are the four varieties of natural silk that India produces. Karnataka produced 32.3% of the country's silk in 2022–2023, with Andhra Pradesh coming in second with 26%. Mulberry silk is the most frequently produced variety. Along with Assam and Bihar, other important states that produce silk are Gujarat, Jammu and Kashmir, Chhattisgarh, Maharashtra, Tamil Nadu, Uttar Pradesh, and West Bengal. Garments, carpets, shawls, scarves, pillow coverings, and accessories are crafted from silk, which is produced in 52,360 villages around India through sericulture. Making silk requires a series of steps including winding, twisting, and weaving.

**3. Agricultural Diversification, Sericulture Practices-** As an aspect of agricultural diversification, sericulture can be a low-capital, high-yield technique. Mulberry tree farming and silkworm raising are part of it. Starting with seedling production, mulberry tree agriculture includes training, nurturing, harvesting, and insect control. A steady supply of tree leaves is provided to the silkworms by the trees (Bergmann.1940, Hatch & C. E, 1957, Braine & P. N. 1904). Rearing silkworms entails several tasks, including collecting adult larvae for transfer to cocooning frames, monitoring the rearing

rooms and equipment, controlling diseases, and preserving eggs. Additionally, sericulture can be a source of employment, as the production of one kilogram of mulberry silk in its raw form requires around eleven man-days of labor. Yearly net revenues can vary between Rs. 12,000 and Rs. 70,000, with the exact figure depending on the silk type and the area beneath the host plants.

**4. Foreign Exchange Earnings-** In the fiscal year 2020–2021, sericulture brought in Rs. 1418.97 crores for India. There was a 25.3% increase, to US\$ 248.56 million, in the value of silk and silk goods exported from India in 2021–2022 (Jayaram, 2024). India earned \$213 million from the sale of silk and silk goods abroad between April 2023 and January 2024. From 2006–07 to 2015–16, the export value of India's raw silk ranged from 30,073 lakhs to 9,123 lakhs. In terms of the quantity of raw silk (including waste) exported from India, the data shows that there is a Compound Growth Rate of 13%.

#### 3.2 Study Area

The author conducted their study about the Role of Sericulture in the Indian economy all over India not the specific region of India. The author wants to analyze the direct impact of sericulture on the Indian economy and how sericulture affects foreign exchange or income.

#### 3.3 Targeted Population

The author targeted the farmers who are involved in sericulture all over India to analyze the role of sericulture in the Indian economy and how sericulture directly affects the nation's economy.

#### 3.4 Sample Size of the study

By plugging in the target precision, confidence level, and estimated population of the property into the COCHRAN FORMULA, one may determine the optimal sample size. Situations involving big populations are deemed to be particularly suitable for COCHRAN'S FORMULA. Since it is more informative to conclude from smaller samples than the larger ones, there is a "correction" that allows one to lower the number provided by Cochran's formula.

#### 3.5 Sampling Technique

##### Simple random sampling

Using this sampling strategy, there is a perfect chance of choosing for each individual in the population. Of all potential sampling approaches, this one requires the least amount of prior data on the population and only requires a single random selection. Random ordinary selection is used to get statistical findings about a population. Every single person in the world is on an exhaustive list.

- the ability to reach out to or access any individual in the population if they desire.
- The ability to gather information from a sufficient number of people.



### 3.6 Collection of data

#### ➤ Primary Data

Material that has been developed by the individual conducting the research, interviews, surveys, or experiments, expressly geared for comprehension and solution of the study topic at hand.

#### ➤ Quantitative Data

Collecting and analyzing data quantitatively is the main focus of quantitative research. It is based on a positivist and empiricist-influenced logical method that prioritized theory testing. Qualitative data was collected, which cannot be measured because it is not numerical. Interviews, focus groups, and observations are some of the various ways it measures the attributes. The name "Categorical Statistical" also applies.

#### ➤ Questionnaires and Surveys

- Create organized surveys to get information from people or organizations. Interviews might take place in person, over the phone, by email, or on a website, can find a wealth of secondary data in outline databases. This includes things like research articles, statistics, economic data, social surveys, records from government agencies, data collected by research institutions, and data shared publicly by organizations and communities through websites and social media. Each of these questions has five points that participants are required to answer (Strongly disagree, Disagree, Neutral, strongly agree, and Agree).

### 3.7 Statistical Tools

#### ➤ SPSS

One tool for analyzing statistical data is IBM SPSS Statistics, which stands for Statistical Program for the Social Sciences. While SPSS's moniker suggests its origins in the social sciences, the program has found new life in a variety of data industries. IBM SPSS Statistics, which stands for Statistical Software for the Social Sciences, is a program that helps with statistical data analysis. Open data is presented in the main view of the program interface in a spreadsheet-like fashion. The metadata that defines the variables as well as the information entries in the data file is seen in its secondary variable view. While SPSS's moniker suggests its origins in the social sciences, the program has found new life in a variety of data industries, SPSS Statistics is useful for a wide range of applications, including handling information, advanced analytics, BI, criminal investigation, and multivariate analysis.

#### ➤ Excel

Microsoft Excel's conventional grid of cells, with rows labeled with numbers and columns designated with letters, is used for data manipulations including mathematical calculations. It has a tone of capabilities

that can take care of all your statistical, engineering, and financial demands. Additionally, while it can display data in graphs, histograms in and charts, its capacity to graphically display data in three different dimensions is restricted. Data can be partitioned using table pivot points and the circumstance manager so that its dependence on distinct elements can be examined from multiple perspectives. A PivotTable is one tool that may be used to analyses data. To achieve this, simplify large data sets using PivotTable fields. One component, called Visual Basic for Usage in Applications, is an environment for programming that makes it easier to apply different numerical algorithms.

### 3.8 Statistical Technique

#### ➤ Factor Analysis

Factor analysis is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. For example, it is possible that variations in six observed variables mainly reflect the variations in two unobserved (underlying) variables. Factor analysis searches for such joint variations in response to unobserved latent variables. The observed variables are modelled as linear combinations of the potential factors plus "error" terms, hence factor analysis can be thought of as a special case of errors-in-variables models.

#### ➤ Descriptive Analysis

Descriptive analysis is a key step in statistical data analysis that involves summarizing and describing the main characteristics of a dataset. It can help researchers: Understand their data, identify mistakes and exceptions, see how variables are related, and Guide future statistical research. Descriptive analysis can be used in a variety of ways, including Communicating change over time, Identifying trends in customer behavior and preference, Market research, and Tracking progress to goals.

#### ➤ Reliability

Reliability analysis is a statistical process that determines how consistent a scale produces results when measurements are repeated. It involves finding the proportion of systematic variation in a scale by determining the association between scores from different administrations of the scale. In research, reliability analysis is used to assess the consistency of measurements. There are four main types of reliability in research: Test-retest reliability, Interrater reliability, Parallel form reliability, and Internal consistency.

## IV. RESULT

Table 1. Demographic details

Variables		n (%)	Sig. (2-tailed)
Gender	Male	183 (47.7%)	<0.001
	Female	201 (52.3%)	
Age	18 – 24	91 (23.7%)	<0.001

Family Members	25 – 34	92 (24.0%)	<0.001
	35 - 44	105 (27.3%)	
	45 or more	96 (25.0%)	
	1 - 2	91 (23.7%)	
	3 - 4	197 (51.3%)	
	5 or more	96 (25%)	

Table 1 shows the breakdown of the sample by age, gender, and family size in the table, as well as the statistical significance of any differences across the categories. There is a considerable gender difference ( $p < 0.001$ ), with 183 males (47.7%) and 201 females (52.3%). Presented here is the age distribution: There are notable variances across the age categories, with 91 participants (23.7%) falling into the 18-24 age bracket, 92 (24.0%) in the 25-34 age bracket, 105 (27.3%) in the

35-44 age bracket, and 96 (25.0%) in the 45+ age bracket. There is a significant difference ( $p < 0.001$ ) in family size, with 91 participants (23.7%) having 1-2 members, 197 (51.3%) having 3-4 members, and 96 (25.0%) having 5 or more.

**Objective 1: To assess the economic contribution of sericulture to the livelihoods of rural communities in India.**

**Table 2: Economic Contribution of Sericulture to Rural Livelihoods**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Sig. (2-Tailed)
<b>Income Generation</b>						
Sericulture is a primary source of income for my household.	14 (3.6%)	31 (8.1%)	20 (5.2%)	55 (14.3%)	264 (68.8%)	0
The income from sericulture is sufficient to meet the basic needs of my family.	12 (3.1%)	28 (7.3%)	17 (4.4%)	60 (15.6%)	267 (69.5%)	0.001
My household income has increased since we started sericulture activities.	17 (4.4%)	31 (8.1%)	21 (5.5%)	44 (11.5%)	271 (70.6%)	0.041
I rely more on sericulture income than on other sources of income.	22 (5.7%)	36 (9.4%)	27 (7.0%)	55 (14.3%)	244 (63.5%)	0
Engaging in sericulture has improved our standard of living.	22 (5.7%)	39 (10.2%)	21 (5.5%)	64 (16.7%)	238 (62.0%)	0
<b>Employment Opportunity</b>						
Sericulture has provided stable employment opportunities in my area.	22 (5.7%)	49 (12.8%)	14 (3.6%)	41 (10.7%)	258 (67.2%)	<.001
Sericulture has reduced my family's dependency on seasonal agricultural income.	14 (3.6%)	32 (8.3%)	13 (3.4%)	76 (19.8%)	249 (64.8%)	0.083
My community has benefitted economically from the growth of sericulture.	18 (4.7%)	32 (8.3%)	14 (3.6%)	58 (15.1%)	262 (68.2%)	0.068
There are limited alternative income sources available other than sericulture in my area.	15 (3.9%)	51 (13.3%)	22 (5.7%)	59 (15.4%)	237 (61.7%)	0.001
<b>Household Income Levels</b>						
The income from sericulture is consistent throughout the year.	20 (5.2%)	36 (9.4%)	21 (5.5%)	59 (15.4%)	248 (64.6%)	
	0.059					

How participants felt about certain claims concerning sericulture's impact on household income, job prospects, and revenue creation in Table 2. With high p-values ( $p = .000$  and  $p = .001$ ), the majority of respondents (68.8%) strongly agree that sericulture is a primary source of income and that it satisfactorily provides necessities. There was a statistically significant rise in household income for the majority of participants (70.6%) after they began sericulture ( $p = .041$ ). Significant p-values indicate that 63.5% of the population relies on sericulture as their primary source of income and that 62.0% of the population believes that

sericulture has raised their life quality. Concerning employment, 67.2% are in full agreement that sericulture offers steady work in their region ( $p < .001$ ), but it is less evident how significant sericulture is in reducing reliance on seasonal income and the economic benefits it brings to the community ( $p = .083$  and  $p = .068$ ). Lastly, 61.7% think there aren't many other ways to get money than sericulture ( $p = .001$ ), and 64.6% think that sericulture revenue is stable all year ( $p = .059$ ).

**Objective 2: To analyze the impact of sericulture on agricultural diversification and sustainability in India.**

**Table 3. Impact of Sericulture on Agricultural Diversification and Sustainability**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Sig. (2-Tailed)
<b>Land Utilization</b>						
Household Income Levels	20 (5.2%)	36 (9.4%)	21 (5.5%)	59 (15.4%)	248 (64.6%)	0
I have diversified my crops due to the integration of sericulture into my farming practices.	24 (6.3%)	46 (12.0%)	22 (5.7%)	61 (15.9%)	231 (60.2%)	<.001
Sericulture allows me to make better use of my land throughout the year.	24 (6.3%)	35 (9.1%)	8 (2.1%)	60 (15.6%)	257 (66.9%)	0.251
My overall crop yield has increased since incorporating sericulture.	20 (5.2%)	32 (8.3%)	12 (3.1%)	60 (15.6%)	260 (67.7%)	0.066
<b>Crop Diversification</b>						
Sericulture has positively impacted the sustainability of my agricultural practices.	22 (5.7%)	32 (8.3%)	20 (5.2%)	76 (19.8%)	234 (60.9%)	0
The cultivation of mulberry plants has improved soil quality on my farm.	17 (4.4%)	27 (7.0%)	16 (4.2%)	75 (19.5%)	249 (64.8%)	<.001
The use of organic practices in sericulture has benefited my other crops.	29 (7.6%)	40 (10.4%)	18 (4.7%)	60 (15.6%)	237 (61.7%)	0.082
<b>Environmental Impact</b>						
Sericulture has helped me reduce the need for chemical fertilizers in my farming.	25 (6.5%)	51 (13.3%)	16 (4.2%)	48 (12.5%)	244 (63.5%)	<.001
I have noticed an improvement in water retention in the soil after starting sericulture.	14 (3.6%)	37 (9.6%)	18 (4.7%)	62 (16.1%)	253 (65.9%)	0.046
Sericulture has encouraged me to adopt more environmentally friendly farming techniques.	18 (4.7%)	43 (11.2%)	18 (4.7%)	62 (16.1%)	243 (63.3%)	0
The income from sericulture supports investment in sustainable agricultural practices.	10 (2.6%)	34 (8.9%)	24 (6.3%)	71 (18.5%)	245 (63.8%)	0.038

This table (3) shows how sericulture affected participants' land use, crop diversification, and environmental habits. Household income levels are positively impacted by sericulture, according to the majority of respondents (64.6%,  $p = .000$ ), crop diversification by 60.2%,  $p < .001$ , and year-round land use efficiency by 66.9%,  $p = .251$ . Additionally, most participants noted that sericulture has led to an increase in sustainable farming practices (60.9%,  $p = .000$ ) and total crop output (67.7%,  $p = .066$ ). Furthermore, 63.5% of respondents think sericulture decreases the necessity

for chemical fertilizers ( $p < .001$ ), and 64.8% are in full agreement that mulberry cultivation has enhanced soil quality ( $p < .001$ ). Also observed are improvements in ecologically friendly farming techniques (63.3%,  $p = .000$ ) and water retention (65.9%,  $p = .046$ ). Finally, 63.8% of people who took the survey think that sericulture money helps fund environmentally friendly initiatives ( $p = .038$ ).

**Objective 3: To examine the influence of government policies and support programs on the growth and development of the sericulture industry in India.**

**Table 4. Influence of Government Policies and Support Programs on Sericulture**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Sig. (2-Tailed)
<b>Government Subsidies and Financial Assistance</b>						
I am aware of the government subsidies available for sericulture activities.	12 (3.1%)	34 (8.9%)	22 (5.7%)	59 (15.4%)	257 (66.9%)	0.042
I have received financial assistance from the government for my sericulture activities.	19 (4.9%)	43 (11.2%)	14 (3.6%)	60 (15.6%)	248 (64.6%)	0
The financial aid from the government has helped me expand my sericulture business.	20 (5.2%)	40 (10.4%)	23 (6.0%)	58 (15.1%)	243 (63.3%)	0.063
<b>Training Programs</b>						
The training programs provided by the government have improved my sericulture practices.	25 (6.5%)	38 (9.9%)	14 (3.6%)	56 (14.6%)	251 (65.4%)	0
I have attended government-organized training sessions on sericulture.	12 (3.1%)	33 (8.6%)	15 (3.9%)	74 (19.3%)	250 (65.1%)	0.082

Policy Effectiveness						
Government policies have been effective in supporting the growth of sericulture in my area.	15 (3.9%)	37 (9.6%)	17 (4.4%)	69 (18.0%)	246 (64.1%)	<.001
I find it easy to access the resources provided by government programs for sericulture.	23 (6.0%)	31 (8.1%)	13 (3.4%)	63 (16.4%)	254 (66.1%)	0.076
The support from government schemes has increased my productivity in sericulture.	23 (6.0%)	43 (11.2%)	15 (3.9%)	47 (12.2%)	256 (66.7%)	0
Government initiatives have made it easier for me to sell my silk products.	14 (3.6%)	41 (10.7%)	20 (5.2%)	68 (17.7%)	241 (62.8%)	0
The policies implemented by the government have directly contributed to the success of my sericulture activities.	16 (4.2%)	38 (9.9%)	13 (3.4%)	61 (15.9%)	256 (66.7%)	<.001

The table 4 shows how the participants feel about the effectiveness of policies, training programs, financial aid, and subsidies from the government in supporting sericulture. With statistically significant p-values ( $p = .042$  and  $p = .000$ ), 66.9% of the population is aware of government subsidies and 64.6% have actually received financial support. Of those who took part, 63.3% have found that financial aid has allowed them to grow their sericulture businesses ( $p = .063$ ). Although 65.1% of respondents had attended government-organized sessions, 65.4% of respondents had improved

their sericulture practices through training programs ( $p = .000$ ). Government policies effectively encourage sericulture expansion, according to the majority of participants (64.1%;  $p < .001$ ), and 66.7% of participants report that government initiatives have enhanced their production ( $p = 2.000$ ). Furthermore, 66.7% of sericulturists believe that government policies directly contribute to their success, and 62.8% say that government initiatives make it simpler to sell their silk products ( $p = .000$ ).

**Table 5: Average level of responses as per studies domain**

	Maximum Score	Score	Sig. (2-tailed)
<b>Income Generation</b>	25.00	21.52 ± 2.72	<.001
<b>Employment Opportunities</b>	20.00	17.06 ± 2.36	.047
<b>Land Utilization</b>	15.00	12.71 ± 2.11	.000
<b>Crop Diversification</b>	15.00	12.68 ± 2.18	.000
<b>Environmental Impact</b>	20.00	16.98 ± 2.37	.042
<b>Government Subsidies and Financial Assistance</b>	15.00	12.78 ± 2.11	<.001
<b>Training Programs</b>	10.00	8.570 ± 1.62	.000
<b>Policy Effectiveness</b>	25.00	21.35 ± 2.67	.000

The results for different sericulture-related criteria are displayed in table 5, with a comparison to the maximum possible scores and an indication of statistical significance. Sericulture strongly benefits revenue production, as evidenced by a score of 21.52 out of 25 ( $p < .001$ ). Significant employment benefits were indicated by a score of 17.06 out of 20 ( $p = .047$ ) for employment opportunities. With very substantial p-values ( $p = .000$ ), sericulture had a favorable effect on land use (12.71) and crop diversification (12.68) out of a possible 15 points.

The positive effects on the environment were highlighted by the environmental impact score of 16.98 out of 20 ( $p = .042$ ). Training courses scored 8.57 out of 10 ( $p = .000$ ), highlighting the significance of government support and training, compared to government subsidies and financial aid which scored 12.78 out of 15 ( $p < .001$ ). The government's policies have had a significant influence on fostering sericulture, as evidenced by the policy effectiveness score of 21.35 out of 25 ( $p = .000$ ).



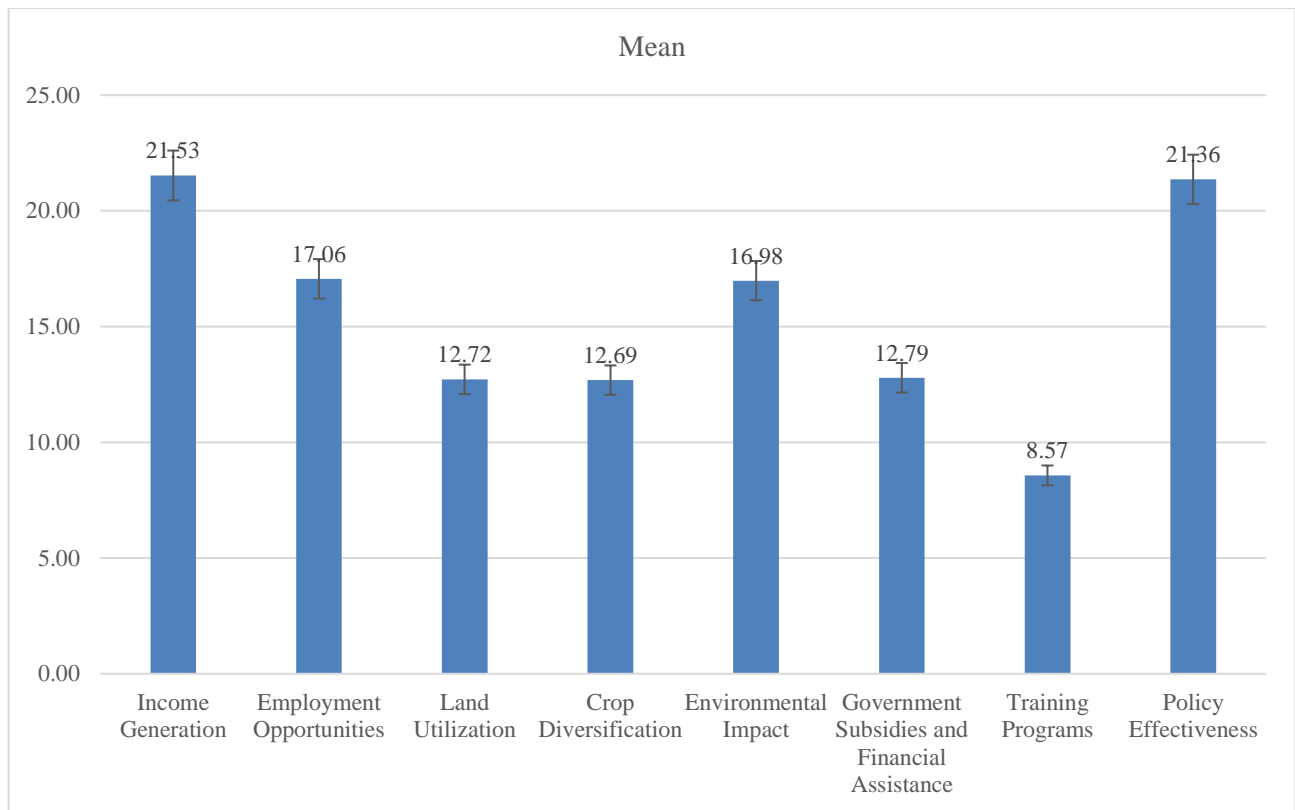


Figure 1- Average level of responses as per studies domain

Table 6: Correlation

		Land Utilization	Training Programs	Policy Effectiveness
<b>Income Generation</b>	Pearson Correlation	0.013	0.081	0.049
	Sig. (2-tailed)	0.804	0.113	0.422
	N	384	384	384
<b>Employment Opportunities</b>	Pearson Correlation	0.054	-0.013	0.072
	Sig. (2-tailed)	0.296	0.805	0.073
	N	384	384	384
<b>Household Income Levels</b>	Pearson Correlation	0.022	0.042	0.031
	Sig. (2-tailed)	0.674	0.414	0.829
	N	384	384	384

Table 6 shows revenue generation, employment opportunities, household income levels, land usage, training programs, and policy efficacy in sericulture are all shown in the table with their corresponding Pearson correlation coefficients. With p-values more than 0.05, the weak and non-significant connections between income creation and land utilization (0.013), training programs (0.081), and policy efficacy (0.049) are evident. Land utilization: 0.054, training programs: -0.013, & policy effectiveness: 0.072), all of which have modest correlations and no significant connections (p-values > 0.05) with job chances. Finally, without statistical significance (p > 0.05), there are only minor connections between household income and land utilization (0.022), training programs (0.042), or policy efficacy (0.031). There does not appear to be any highly

significant relationships between these factors, according to the data in the table.

## V. CONCLUSION

Economically, sericulture—the raising of silkworms to make silk—is very important to India, especially in the areas of rural development, job creation, and export earnings. Sericulture has a long and storied history in India, making it one of the top silk producers globally. For millions of rural households, particularly in regions like West Bengal, Andhra Pradesh, and Karnataka, sericulture remains an indispensable means of subsistence. About 9.4 million people are employed in sericulture across the nation. A large number of these workers are women and members

of disadvantaged communities, which means that sericulture helps to empower these areas socially and economically. Consistent revenue generation, especially for small and marginal farmers, is one of sericulture's primary benefits. Sericulture is an alternative to conventional farming that yields fast profits with little initial commitment. Because of this, it's a good choice for farmers that have to deal with weather changes and crop price swings. Because silkworms primarily feed on mulberry trees, which can be grown on marginal sites that would not be suited for other crops, sericulture also encourages year-round land utilization. An important part of India's export economy is sericulture as well. In addition to being a major consumer of silk products, India ranks second in the world for silk production. Silk yarn, silk fabrics, and raw silk all contribute significantly to the country's trade balance through their export. Government programs that encourage sustainable sericulture techniques, as well as training programs and financial subsidies, also help the business. As a whole, sericulture in India is an important part of rural economies, providing jobs and sustaining traditional ways of life. Sericulture can considerably enhance its position in the Indian economy with the continuation of government backing and advancements in environmentally friendly practices.

## REFERENCES

- [1] Savithri, G., Sujathamma, P., & Neeraja, P. (2013). Indian sericulture industry for sustainable rural economy. *International journal of Economics, commerce and research*, 3(2), 73-78.
- [2] Bharathi, D. (2016). Sericulture industry in India-A source of employment generation. *International Journal of Advanced Engineering Research and Science*, 3(10), 236881.
- [3] Naik, A. H. (2017). An Overview of Sericulture Industry in Kashmir. *IMPACT: International Journal of Research in Humanities, Arts and Literature (IMPACT: IJRHAL)* ISSN (P), 2347-4564.
- [4] Altman, G. H., & Farrell, B. D. (2022). Sericulture as a sustainable agroindustry. *Cleaner and Circular Bioeconomy*, 2, 100011.
- [5] Dewangan, S. K. (2013). Livelihood opportunities through sericulture a model of gharghoda tribal block, Raigarh dist. *American Journal of Environmental Sciences*, 9(4), 343-347.
- [6] Girish, C., Kadian, K., Meena, B., & Mandi, K. (2020). An assessment of livelihood security of farmers practicing sericulture based dairy farming in Karnataka state. *International Journal of Livestock Research*, 10(6), 43-50.
- [7] Ram, R. L., Maji, C., & Bindroo, B. B. (2016). Impact of climate change on sustainable sericultural development in India. *International Journal of Agriculture Innovations and Research*, 4(6), 1110-1118.
- [8] Ssemugenze, B., Esimu, J., Nagasha, J., & Wandui Masiga, C. (2021). Sericulture: Agro-based industry for sustainable socio-economic development: A review.
- [9] Taufique, M., & Hoque, M. A. (2021). Current scenario of sericulture production in India: a spatio-temporal analysis. *International Research Journal of Education and Technology (IRJEdT)*, 2, 12-23.
- [10] Rajesh, G. K., & Muchie, M. (2022). An Innovation Systems Perspective on Agricultural Technology Diffusion: The Case of India's Sericulture. In *Innovation Systems, Economic Development and Public Policy* (pp. 131-160). Routledge India.
- [11] Bharathi, D. (2016). Sericulture industry in India-A source of employment generation. *International Journal of Advanced Engineering Research and Science*, 3(10), 236881.
- [12] Bukhari, R., Kour, H., & Aziz, A. (2019). Women and the Indian sericulture industry. *International Journal of Current Microbiology and Applied Sciences*, 8(05), 2319-7706.
- [13] Jalba, H. C. (2016). Scenario of sericulture industry in Maharashtra State, India. *Journal of Entomology and Zoology Studies*, 4(1), 601-605.
- [14] POPESCU, A., ŞERBAN, V., & CIOCAN, H. N. (2024). NEW TRENDS IN THE GLOBAL SILK PRODUCTION IN THE PERIOD 2011-2022. *Scientific Papers Series Management, Economic Engineering in Agriculture & Rural Development*, 24(1).
- [15] Dhakal, R., Sahu, R. K., Gupta, D. D., Saikia, M., Borthakur, S., Majumder, M., ... & Kalita, J. (2024). Recycling of protein rich silk industry waste for potential food and therapeutic application. *Food Bioscience*, 104461.
- [16] Bergmann, W. (1940). Relations between the food and silk of silkworms. *Textile Research*, 10(11), 462-475.
- [17] Hatch, C. E. (1957). Mulberry Trees and Silkworms: Sericulture in Early Virginia. *The Virginia Magazine of History and Biography*, 65(1), 3-61.
- [18] Braine, P. N. (1904). *The cultivation of silkworms: a guide to their rational treatment, with notes on every species grown in Ceylon*. AM & J. Ferguson.
- [19] Jayaram, H., Mahadevegowda, L. G., & Boregowda, M. H. (2024). Sericulture Entrepreneurship: Current Status and Potential Opportunities.