



INDIAN SERICULTURE INDUSTRY WITH PARTICULAR REFERENCE TO JAMMU & KASHMIR

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ABSTRACT

Sericulture is the production of silk through rearing of silkworm. It is not only a tradition but also a living culture in our country. It is a farm-based, labor intensive and commercially attractive economic activity falling under the cottage and small-scale sector. It particularly suits rural-based farmers, entrepreneurs and artisans as it requires low investment with potential for relatively higher returns. It provides income and employment to the rural poor especially, farmers with small land-holding and marginalized and weaker sections of the society. India is the second largest producer of raw silk after China and the biggest consumer of raw silk and silk fabrics and has the unique distinction of producing all the four varieties of silk viz., Mulberry, Tasar, Eri and Muga (Giridhar *et al.* 2010). The bivoltine sericulture development has been one of the priority sectors of Indian silk industry but its production is yet to meet the targets. Jammu and Kashmir is the only state of the country which is in the same altitude in which leading Bivoltine Sericulture countries of the world lie. Even the Sericulture experts of Japan have recognized the superiority of natural climatic conditions in the state favorable for the development of Sericulture and for the production high grade raw silk of international quality. Women play a dominant role in this sector, as the activities are mostly home-based. Women have been contributing to all the sectors of Sericulture starting from on-farm activities to fabric production, marketing and consumption. The involvement of women in different activities of Sericulture is well above 53 per cent (Gangopadhyay, 2008).

INTRODUCTION

The practice of sericulture constitutes one of the important agro - based pursuits with which rural population is associated from ancient times. Sericulture industry of India enjoys well established status which guarantees both direct and indirect employment to various stakeholders and aids in augmenting their income in some of the states, where as in other states it serves as a full fledged avenue for earning livelihood. Although sericulture sector provides sufficient returns to the farmers in less possible time, yet it does not involve possession of larger land holdings, sufficient capital & investment incentives or adequate farm infrastructure, but has an ample employment generating potential.

The reduction of rural poverty continues to be a paramount goal of the developing countries like India as the majority of the poor population still resides in these areas. The World Bank, for example, estimates that more than 70 % of the world's poor live in rural areas. So far, various strategies have been pursued to address this concern and among the major ones is rural employment creation. The agriculture sector, however, has been confronted with a number of factors that have limited its potential for generating new jobs in rural areas. It is, therefore, necessary to focus on a broader spectrum of the rural economy through improved ways and means. Thus the establishment of rural based industries like sericulture, in particular, can be very effective tool for providing succor to landless farmers and can also in a long way address the

problems of rural women who can also make their earnings through its practice.

Sericulture is both an art and science of raising silkworms for silk production. Silk as a weavable fiber was first discovered by the Chinese empress Xi Ling Shi during 2,640 B.C. and its culture and weaving was a guarded secret for more than 2,500 years by the Chinese. Silk was a profitable trade commodity in China. Traders from ancient Persia (now, Iran) used to bring richly coloured and fine textured silks from Chinese merchants through hazardous routes interspersed with dangerous mountainous terrains, difficult passes, dry deserts and thick forests. Though, commodities like amber, glass, spices and tea were also traded along with silk which indeed rapidly became one of the principal elements of the Chinese economy and hence, the trade route got the name 'SILK ROUTE'. Even today, silk reigns supreme as an object of desire and fabric of high fashion. Being a rural based industry, the production and weaving of silk are largely carried out by relatively poor sections of the society and this aspect of sericulture has made it popular and sustainable in countries like China and India.

Sericulture Industry in India and its strengths

If fashion is a fine art, then silk is its biggest canvas, and if silk is the canvas, then all its weavers, dyers, designers, embroiderers are the greatest artists. Indian silk has enthralled fashion watchers and all categories of consumers across the world with its vast repertoire of

motifs, techniques and brilliant hues. India's traditional and culture bound domestic market and an amazing diversity of silk garments that reflect 'geographic specificity' has helped the country to achieve a leading position in silk industry.

Present status

India is the second largest producer of raw silk after China and the biggest consumer of raw silk and silk fabrics. An analysis of trends in international silk production suggests that sericulture has better prospects for growth in the developing countries rather than in the advanced countries. Silk production in temperate countries like Japan, South Korea, Russia etc., is declining steadily not only because of the high cost of labour and heavy industrialization in these countries, but also due to climatic restrictions imposed on mulberry leaf availability that allows only two

cocoon crops per annum. Thus, India has a distinct advantage of practicing sericulture all through the year, yielding a stream of about 4 – 6 crops as a result of its tropical climate. In India, sericulture is not only a tradition but also a living culture. It is a farm-based, labour intensive and commercially attractive economic activity falling under the cottage and small-scale sector. It particularly suits rural-based farmers, entrepreneurs and artisans, as it requires low investment but, with potential for relatively higher returns. It provides income and employment to the rural poor especially farmers with small land-holdings and the marginalized and weaker sections of the society. Several socio-economic studies have affirmed that the benefit-cost ratio in sericulture is highest among comparable agricultural crops (Table 1).

TABLE1: Cost: Benefit analysis of mulberry sericulture and other competing crops

Item	Mulberry sericulture	Sugarcane	Turmeric
Total input costs	48,659	30,575	29,610
Gross returns	96,132	60,200	55,317
Net returns	47,476	29,625	25,707
CB ratio	1:1.98	1:1.97	1:1.02
Crop period	1 year	1 year	4 – 5 months

Note: Data in Rs/acre/annum

Source: Presented at the 20th Conference of the International Sericulture Commission, Bangalore, December, 2005

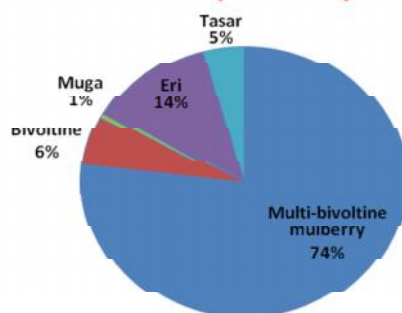
Currently, the domestic demand for silk, considering all varieties, is nearly 29,300 MTs, of which only around 20,410 MTs (2010-11) is getting produced in the country and the rest being imported mainly from China (CSB,2011). Indian domestic silk market has over the years been basically driven by multivoltine mulberry silk. Due to inferior quality of the silk produced, India could not meet the international quality standard. Though, R&D efforts have been made to improve the quality of multivoltine silk, even the best of multivoltine silk produced could not match the bivoltine silk in quality. Therefore, it is essential to enlarge the production base and improve current productivity levels of bivoltine silk to meet the international standards and quality demands of the power loom sector. Steps need to be taken to ensure that export oriented units having automatic state of the art weaving machinery are established.

Employment Potential

Sericulture has been promoted as an agro-based, labour intensive rural oriented cottage industry in the country, providing gainful employment mainly to the weaker and

marginalised sections of the society. It is a highly remunerative occupation requiring little capital investment. It is estimated that sericulture can generate employment @11 man days per kg of raw silk production (in on-farm and off-farm activities) throughout the year. In China 20 million farmers and 5 lakh people are occupied by sericulture and silk processing industry. In India 59000 villages providing employment to 6 million people from the farm sector and silk processing industry are practicing sericulture. Employment and income generation is primarily among the disadvantageous groups, i.e., women, SCs, STs and minorities and other marginalized groups are also substantially involved. In the year 2010-11 the employment in sericulture sector was 72.5 lakh persons (i.e.52.20 lakh farmers, 3.70 lakh reelers and 16.60 lakh weavers) when compared to 68.17 lakh persons during 2009-10. Moreover, 55-60% of the Sericultural activities are undertaken by rural women. CSB has in its CDP programme designed for XI Plan period, a special scheme for Women in Sericulture viz. Women Empowerment (CSB, 2011).

Variety wise raw silk production in India (2010-11)



India has the unique distinction of being a producer of all the five commercially traded varieties of natural silks namely, Mulberry, Tropical Tasar, Oak Tasar, Eri and Muga. Silk obtained from sources other than mulberry are generally termed as non-mulberry or Vanya silks. The bulk of the commercial silk produced in the world is mulberry silk that comes from the domesticated silkworm, *Bombyx mori* L. which feeds solely on the leaves of the mulberry (*Morus sp.*) plant. Variety-wise share of raw silk production during the year 2010-11 has been depicted in Figure below.

Trends in Indian sericulture

Over the last six decades Indian silk industry has registered an impressive growth, both horizontally and vertically. Plans and schemes implemented by central and state agencies and relentless efforts of thousands of dedicated persons in the fields of research and extension have helped in this context. For instance, the age old multivoltine hybrids have been replaced by multivoltine × bivoltine and bivoltine hybrids. The sericulture industry has witnessed a quantum jump in raw silk productivity. The average yield of 25 kgs of cocoons/100 dfls in the recent past has increased and currently the average yields are in the range of 60 – 65 kgs/100 dfls. The new technology, besides doubling yields has also led to qualitative improvements in cocoon production with considerably reduced renditta and has also helped break the climate barrier.

While India produced around 20,410 MTs (*provisional*) of raw silk annually (2010-11), total annual consumption of silk in the country is around 29,300 MTs. The additional requirement of silk (particularly, Bivoltine Mulberry Silk of international quality) is imported mainly from China. Therefore, there is scope for production of additional quantity of silk in the country to meet the

domestic demand. The raw silk production which was around 16,319 MT during the year 2002-03 has increased to 18,475 MT during the year 2006-07, showing an increase of around 13.21% in spite of various constraints like drought in traditional sericultural areas of southern peninsula during the year 2002-03 and 2003-04. This apart, the prices of sericultural commodities had come down during the same period due to large scale dumping of Chinese Silk (yarn and fabrics) into the country. However, the situation has now improved and the prices of sericultural commodities have improved because of imposition of Anti-dumping Duty on the low grade silk yarn and fabrics imported from China. The stakeholders of the silk industry are now showing keen interest to take-up sericulture on a large scale due to favourable conditions. During the year 2011-12, it is anticipated that total provisional production of all varieties of raw silk will be 22,671 M.Tons compared to the production of 20,410 M.Tons by the end of 2010-11 (*CSB, 2011*). Production of mulberry raw silk during 2010-11 was 16,360 M.Tons compared to the production of 16,322 MTs in the year 2009-10. Production of Vanya silks (Tasar, Eri and Muga) during 2010-11 were 1166 MT, 2,760 MT & 124 MT respectively, corresponding to 803 MT, 2460 MT & 105 MT produced during the year 2009-10 (*Giridhar et al., 2010*). Vanya silks viz., Tasar and Eri have shown significant increase in production of raw silk during the year 2010-11.

Raw silk production

Among the traditional sericulture states, Karnataka ranked first with its contribution of 7360 MT's followed by Andhra Pradesh (5119 Mt's) and West Bengal (1865 MT's) s shown in the table below, while Tamil Nadu registered highest production in bivoltine raw silk production with 351 MT's (*Giridhar et al., 2010*).

TABLE 2: State-wise production of mulberry and Vanya raw silk (2009-10)

State	Mulberry			Vanya (non-mulberry)				G. Total	% of the state
	Plantation (ha)	Raw silk prod (MT)	% of the state	Tasar	Eri	Muga	Total		
Traditional state									
Karnataka	82098	7360	45.09	-	-	-	0.00	7360	37.38
Andhra Pradesh	36384	5119	31.36	10.00	8.00	-	18.00	5137	26.09
Tamil Nadu	14220	1233	7.55	-	-	-	0.00	1233	6.26
West Bengal	12374	1865	11.43	37.00	13.00	0.20	50.20	1915	9.73
J & K	7063	110	0.69	0.50	-	-	0.50	111	0.56
Sub total	152139	15687	96.11	48	21	0.20	69	15756	80.02

(*Giridhar et al. 2010*)

2009-10 and 2010-11 proved to be promising with reference to Vanya silk production. Production of vanya silk (Tasar, Eri and Muga) during 2010-11 were 1166, 2760 and 124 MT's respectively corresponding to 803, 2460 and 105 MT's produced during 2009-10 (*Indian Silk, Aug, 2011*). As regards Tasar silk production Jharkhand ranked first with its contribution of 403.70 MT's followed by Chattisgarh (161.00MT's) and Madhya Pradesh (74.00 MT's). While Assam retained its first position in Eri silk production with 1410 MT's followed by Meghalaya (450 MT's) and Manipur (280 MT's) (*Giridhar et al., 2010*).

Indian position in global sericulture

India is the second largest producer of silk in the World, next to China, with 14.57% share in global raw silk production. The World production of raw silk as on 2010 is 1, 40,051 M.Ts (*provisional*). China produces 1, 15,000 M.Ts being the first in the World. India produced 20,410 M.Ts of silk during 2010-11. Brazil, Thailand Uzbekistan and Vietnam are also producing silk around 4,423 M.T. in a year (*CSB, 2011*). India produced around 4,050 M.Ts of Vanya Silks (Tasar, Eri & Muga) in a year, which has very good market.

Though, Indian breeds/hybrids have the potential to produce the same quality, our system of sericulture

practices is entirely different from that of China. The strict maintenance of discipline and better linkage from farmers to weavers, large-scale operation of egg production, reeling and weaving using modern machineries, strict control measures for diseases, uniform adoption of new technologies, supply of required quantity of quality eggs in time to avoid the chances of contamination of young silkworm etc. make the Chinese sericulture more vibrant,

economically sound and sustainable. Another area of difference is that the entire production is state controlled with no open marketing/auction systems for silk cocoons and yarns. The comparative statistics (Table 3) indicate the strength of China in the areas of seed production and distribution system, higher unit area productivity and quality thus reducing the costs of production.

TABLE 3: Comparative mulberry sericulture statistics- China vis-à-vis India

Parameter	China*	India
Area under mulberry (lakd ha.)	7.36	1.79
Leaf yield (MTs/ha/yr)	25-30	30-50
Races reared	All bivoltine	Mostly cross breeds
Egg production (crore dfls)	75.962	25.65
Supply syste,	Majority chawki reared	Majority supplied as eggs
Time of supply	Batch-wise	Throughout the year
	2-3: Temperate	5-6
No. of crops per yea		
	6-8: Tropical	8-12 (Split plot system)
Dfls brushed / ha / yr	1050	1492
Cocoon yield (kg / 100 dfls) (2 boxes)	75.92	51.0
Leaf cocoon raio (kg)	16-18	20-22
Cocoon yield (kg / ha)	736.89	698.0
Cocoon weight (g)	1.9-2.0	1.6-1.8
		CB: 17-19
Cocoon shell percentage (%)	21-23	BV: 20-22
Filament length (m)	>1000	<1000
Renditta	6.4	8.2 (6.9 for bivoltine)
Grade of silk	A – 4A	Un-graded to A grade
Cost of cocoon production (Rs. / kg)	40-45	65-70
Prevailing cocoon price (Rs)	85-90	90-120
Raw silk production (kg/ha/yr)	114.87	85.02
Av. Crop loss / year (%)	3-5	10-15
Demand and supply position	90% Export	Self consumption 30 % deficit
Raw silk produced (MTs / yr)	86500	15445

*Source: *Li Long and Hu Zhuozhong, Indian Silk, May 2006.*

Export Potential

The market share of Indian silk exports in the global silk trade is 4 – 5 % which is not significant considering the fact that India is the second largest producer of raw silk. This is because India has a large domestic market for silk goods and about 85 % of silk goods produced are sold in the domestic market. However, India exports approximately 15 % of its output of all types of silk goods (including value-added items). The export of Indian silk products consists of finished goods like fabrics, made-ups, ready-made garments and furnishing materials like curtains, carpets, bed spreads, cushion covers etc. The export earnings from the silk are growing steadily because of increasing demand for Indian Silk goods particularly, from the USA and European countries.

Exports earnings which was `2,294.05 crores during the year 2002- 03 has increased to `3,338.35 crores during the year 2006-07, showing an increase of around 45.52%. However, there was a slump in silk goods exports of about 18.3% (`2,727.87 crores) during the year 2007-08 compared to 2006- 07. The Silk goods export earnings for the year 2008-09 increased by 16.5% (`3,178.19 crores) over the previous year's performance which was `2,727.87 crores. However, export of silk and silk goods during the year 2009-10 decreased by 9% (`2,892.44 crores) over the previous year's performance. During the year 2010-11, export earnings have slightly declined to `2,723.86 crores(prov), when compared to `2,892.44 during 2009-10. The slump in export is due to the problem faced in the

Power loom sector. The India Silk Goods have high export potential because of its distinctiveness and low production cost. India, being a traditional Sericultural country, holds a unique position in the world, since it has the distinction of cultivating all the four commercially known varieties of

Vanya Silks viz., Tasar, Oak Tasar, Muga and Eri, in addition to the mulberry silk. The export potentialities of these Vanya Silks are yet to be exploited on commercial scale.

TABLE 4: Total export earning from the silk and silk goods

Year	Total export earning (Rs/crores)	Increase/decrease (%)
2002-03	2294.05	
2006-07	3338.35	45.52
2007-08	2727.87	-18.30
2008-09	3178.19	16.50
2009-10	2892.44	-9.00
2010-11	2723.86	-5.82

Source: CSB, Bangalore document sept, 2011

Urbanization in traditional silk producing States, fluctuations in market prices of mulberry commercial cocoons, no substantial increase in the price of cocoons and the silk over a decade as compared to other agricultural crops, inflow of Chinese silk to Indian market

through various, scarcity of agricultural labour due to migration from rural areas to urban areas for high labour wages and erratic rainfall in sericulture areas are the reasons behind the fluctuations in production.

Future prospects of Indian silk exports

Future prospects of Indian silk exports can be summarized in yes or no under following situations:

Yes	No
When the indigenous mulberry raw silk is of excellent quality	When the main raw material is of poor quality leading to a bad product which can not be sold
When the mulberry raw silk is imported at optimum prices	
All the wheels of export production & marketing are in excellent position	When the wheels of production and trade are not in alignment

Potential, strengths and challenges of sericulture industry in India

The strengths, weakness, opportunities and challenges (SWOT analysis) of Indian silk industry have been given in Table 6.

TABLE 5: SWOT analysis of the Indian silk industry

Strengths	Weakness	Opportunities	Threats
Large production base, availability of skills, land and labour.	Gaps in technology transfer and extension support.	Generation of rural employment and reduction of migration to urban areas.	Falling international prices and heavy dumping from China at low prices.
Established infrastructure, availability of silkworm breeds / hybrids.	Inadequate market accessibility, poor linkage among different stake holders.	Liberalization policies of Govt. of India in line with WTO Agreements.	Unpredictability of China's silk policies.
Low investment, short gestation period and higher returns.	De-centralized nature of the industry inhibits financial institute from extending financial support to the sector.	Reduction of production of silk even by traditional silk countries like Japan, USSR etc.	Inability of the silk industry to react and adopt to the changing needs in terms of quality both for the domestic and export markets.
Easily adoptable technologies and strong domestic demand-pull.	Lack of quality based pricing system in the market, frequent price fluctuations and large scale imports from China at low prices.	Garment exports are on a steady increase with huge employment opportunities.	Lack of awareness in the domestic market to respond to the demand-driven milieu.

Approaches for the development of Indian silk industry

- ▶ Evolution of appropriate cost-effective technologies through focused research projects addressing constraints and maximizing the production of quality eggs.
- ▶ Teaming up of sericulture scientists with molecular biologists, bio-engineers, immunologists, textile technologists, clinicians, experts from industry and a host of other stakeholders in charting out a new road map.
- ▶ Adoption of region and season specific approaches in the development of superior breeds / hybrids and feed package of practices
- ▶ Establishment of close linkage between forward and backward sub-systems for greater efficiency and synergy
- ▶ Establishment of close linkage between forward and backward sub-systems for greater efficiency and synergy as sericulture and silk industry is highly scattered and unorganized.
- ▶ Identification and promotion of potential clusters for Bivoltine and Vanya silk production in potential traditional and non-traditional areas.
- ▶ Skill up-gradation through structured and specially designed training programmes.
- ▶ Capacity building for production and supply of adequate quality planting material, silkworm seed, reeling cocoons and silk yarn through promotion of large-scale production units with required techno-financial support.
- ▶ Development and promotion of participatory extension system for effective adoption of technologies by similar stakeholders.

- ▶ Protection of Indian silk market from Chinese by implementing anti-dumping duty.
- ▶ Effective utilization of by-products for value addition. (D.Gangopadhyay)

Sericulture in Jammu and Kashmir

“Kashmir in view of its favorable climatic conditions could be converted into Silkworm gene bank for sustaining the sericulture of the whole world”--Dr.Tazima

J&K state is known for producing bivoltine silk of international quality. Being one of the traditional agro based industries of the state, producing high quality bivoltine silk comparable to international quality helps in improving the economic condition of the landless farmers and weaker sections of the society and providing employment opportunities during pre and post cocoon activities. Presently about 25500 rural families generating income worth Rs.1100 lakhs annually & 1 lakh mandays in private reeling sector are associated with this profession (Dhar et al., 2011). With the increased economic needs due to changing social status and unpredictable market trend of different kinds of produces by the farmers of the state, sericulture has assumed special significance as an important subsidiary occupation which supplements the income of the farmers in addition to their returns from the other crops. Basic feature of this farm based economic enterprise is the involvement of women. However production of quality bi-voltine silk is still a challenge in J&K having enormous potential to produce bivoltine silk of international grade, can help to reduce the import of bivoltine silk in the country.

Statistics of sericulture in J& K

An analysis of trends suggests that the main objective of increasing cocoon production, income generation, productivity and the number of silkworm rearers has been achieved.

Year	Cocoon crop (MT)	Income generation (Lakhs)	Avg.price for “A” grade silk (Rs.)	Productivity per Oz (Kg)	Silkworm rearer popn (no’s)	No. of sericulture villages	No. of mulberry trees (000 no’s)	Raw silk Prod.(MTs)
2008-09	738	455.67	192.00	32.00	19700	2420	8100	82
2009-10	810	800.00	300.00	35.00	22800	2421	8100	100
2010-11	860	1100.00	410.00	40.00	25500	2500	8690	110

Source: Economic Survey, 2010-11

Sericulture in J & K and North Western states – a Glimpse

Jammu And Kashmir State is the leading bivoltine cocoon producing among North-Western states of the country in terms of production as indicated below:

S.No.	Particulars	Cocoon production (MTs)	Raw silk production (MTs)
01.	Jammu and Kashmir	860.00	110.00
02.	Himachal Pradesh	101.40	10.00
03.	Uttaranchal	1.30	15.29
04.	Punjab	0.26	2.60
05.	Uttarpradesh	2.00	22.22

Source: Economic Survey, 2010-11

Salient Features of the sector

- About 25500 rural families are practising sericulture as a subsidiary occupation by producing about 860MTs of silk cocoon.
- About Rs.1100 lakh are directly being earned annually in cash by the farmers without any role of middleman.
- About 6.00 lakh mandays by way of employment are being generated annually.

- About 1.50 lakh metres of silk cloth are produced per annum, which again generates income and employment.
- After demonopolization of the industry, the no. of reeling units in the private sector has risen to 31.
- There are 173 departmental nurseries spread over an area of 962.81 acres producing about 20.00 mulberry plants at present, having production capacity of about 38.00 lakh plants.
- The department has 219 no.'s of mulberry farms spread over an area of 917 acres, having mulberry tree population of 9.33 lakh, helping landless people.
- The department has 10 basic seed stations & 17 grainages producing about 17000 ounces of silkworm seed.

Initiatives taken by the state Govt. for promotion of sericulture in J&K:

1. **Implementation of scheme “Health Insurance for women”** The scheme aims at providing insurance cover to the women engaged in silkworm rearing. It has been introduced in the state for the first time. 5000 and 2500 women rearers were brought under this scheme during 2009-10 and 2010-11 respectively.
2. **Implementation of scheme “Marketing Support to Cocoon Growers”** About an amount of Rs.32.10 lakhs has been paid to cocoon growers of the state as marketing support on account of low prices fetched by them.
3. **Implementation of scheme “Cluster Development Programme”** 4 clusters at Tral (Rs.246.575 lakh) and Bandipora (Rs.251.325 Lakh) in Kashmir Division; Nowshera (Rs.238.116 Lakh) and Tikri, Udhampur (Rs. 244.496 lakh) in jammu Division have been launched in the state to adopt holistic approach for development of sericulture in these areas.
4. **Implementation of scheme “Cluster Plantation”** Concept of Cluster Plantation, both Departmental as well as at Farmers level, has been introduced for the first time in the state, with a minimum of 100 plants to the tune of Rs. 2250/beneficiary per cluster, to augment area under mulberry plantation and during



Low Cost Polyhouse at TSRI, SKUAST-K

Development of low cost technologies

Low Cost Rearing Hut designed and fabricated with a view to solve the problem of inadequate space of rearing with farmers has earned wider acclaim. These huts are fabricated out of the locally available material and the investment is very low. One such hut was constructed at the official residence of Hon'ble Minister for Agriculture

2010-11 11.00 lakh plants were planted under this scheme.

5. **Implementation of scheme “Supply of Rearing Kit”** Under catalytic Development Programme 2000 rearers were provided rearing kits at a unit cost of 0.20 lakh and 200 rearers at a unit cost of 0.40 lakh under cluster promotion programme during 2010-11.
6. **Implementation of scheme “Technological advancement scheme”** Hot Air Dryers with capacity of drying 3000Kgs of cocoons in a single shift has been introduced in Jammu. This dryer can also be used for drying other agricultural crops during off seasons.

Role of Temperate Sericulture Research Institute, SKUAST-K

1. **Development of high yielding silkworm genotype**



Newly Developed Silkworm, Breed

TSRI (Temperate Sericulture Research Institute) successfully evolved 18 new and productive silkworm genotypes. SKAU-R-1 and SKAU-R-6 & their hybrid SKAU-HR-1 have been notified for commercial exploitation in J & K. SKUAST-28 & SKUAST-30 are at pre release stage. Season specific breeds like SK13xSK31 and SK31xSK6 are in pipe line.

2. **Development of zero energy cost effective poly house technology for quick propagation of mulberry**

The valley in general is not having sufficient mulberry plantation to fulfill feeding requirements of worms up to desired extent. The technology has served as a boon for the industry in the sense that good number of plants can be raised through economic amalgamation of time and cost.



and Sericulture, Govt of Jammu and Kashmir in the month of May 2010 and a crop yield of 15.20 Kg (60.80 Kg/ounce) was harvested on June 23, 2010.

Low Cost Solar Cocoon Dryer has been developed by this institute for quick and efficient drying of cocoons for the overall benefit of stakeholders. This dryer is made of iron fitted with an adjustable mirror. Inside temperature rises

upto 70°C against 30 °C under normal sundrying method. It dries cocoons in 3-4 days as against 7-10 days of sun

drying. Capacity of the dryer is 5 kg & lasts at least for 20 years.



A. Low Cost Cocoon Dryer



B. Low cost Rearing Hut



C. Value added products

To improve the returns of farmers practising Sericulture, some value added products viz., Mulberry jam, Syrup, Mulberry tea and Mulberry feed block were developed. Based on the highly satisfactory performance, Mulberry jam & Syrup was marketed by the state Agro Industries Department during 2010 under the name SNOWKIST.

Problems of Sericulture in J&K State

- Silkworm seeds are distributed more than the requirement as per reports which lead to leaf shortage in the later stages of rearing.
- Farmers conduct rearing in dwelling houses without proper ventilation and donot have separate rearing houses.
- They are reluctant to disinfect their houses properly as they themselves live in the same houses.
- Unhygienic methods of rearing leading to disease outbreak.
- Most of the farmers are supplied incubated seed only and not the chawkie worms.
- Farmers use neither stands nor trays for rearing silkworms and rear them either on floors or temporary shelves under crowded conditions.
- Poor quality of mulberry leaf leading to prolonged larval life.
- Monocropping and low leaf production from age old plants of inferior genetic stock.
- Spinning of cocoons is not done properly and sun drying of cocoons is very common affecting the reelability and quality of silk.
- Due to these defects farmers are unable to get remunerative price for their cocoons.
- Weak sericulture Extension mechanism.
- Poorly developed weaving and reeling sector.
- Marketing facilities are not adequate.

Steps for further development of Sericulture in Jammu and Kashmir

- Introduction and development of region and season specific silkworm races and mulberry varieties.
- Increase in area under mulberry cultivation through large scale plantation of improved mulberry cultivars.
- Promotion of mulberry sericulture enterprise in hilly/border and backward areas.

- Promote mechanization and rationalization in the field of mulberry cultivation, silkworm rearing and silk reeling to bring down the cost of raw silk.
- Give sufficient research focus in breeding top obtain suitable bivoltine races
- Enhance economic viability of reeling activity through effective utilization of by-products
- Apply eco-friendly integrated nutrient/disease and pest management strategies both for mulberry and silkworm
- Contribution of women in sericulture development needs to be recognized.
- Middle level functionaries and technicians should be trained
- Massive training to farmers on the basis of result demonstrations, farm field school, printing of literature etc.
- Study tours/farmer tours to research institutions and advanced sericulture states should be organized regularly
- Assistance to seri enterprises/seri graduates to set up sericlinics/seri business centres
- Proper and timely marketing facilities
- Concentration of efforts on small and marginal farmers
- Joint efforts of researchers, extension specialists and farmers to test and modify improved sericulture technologies appropriate for local conditions
- Development of sericulture under NREGA.

CONCLUSION

The state of Jammu and Kashmir is having a temperate climate, as such offers salubrious conditions for production of quality bivoltine silk. But unfortunately the industry slipped back to take a lead position among the sericultural zones of the country. Thus future of the modern silk industry has been identified to be closely linked with the stable sericulture carried on scientific lines, active and well knit extension support, propagation of quality mulberry varieties, awareness of the benefits of sericulture activity among farmers, practice of conducting not less than two rearings in a year, a well organized system of production and supply of disease free eggs, use of by-products of sericulture activity, modernization of

reeling sector, rationalization of marketing of cocoons and raw silk, building of polyhouses to facilitate the production of grafts and cuttings, popularization of low cost technologies at farmers level etc. This will give an attractive image to the silk industry in the global silk markets. Besides need based research, keeping in view the status of the rearers and their requirement can also lead to their attraction in sericulture in a big way.

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