"Indian Sericulture Industry: Its Importance, Problems and Prospects"

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Abstract

Silk, a highly priced agricultural commodity, accounts for about 0.2% of the total world production of textile fiber. Since sericulture stands next to agriculture for rural employment in India, it becomes a matter of concern to examine the sericulture production trend over the years and reasons for slow growth. Sericulture is an important agro industry in Indian economy [1]. India is the only country in the world which produces all varieties of silk namely tasar, muga and mulberry. India occupies a predominant position in the world and it is the second largest producer of silk after China. Though Indian silk industry occupies a predominant position in the world, its production is only 15% of total world production and more than 80% of production is contributed by China. India's export has adequately progressed during the study period with both quantity and value of export showing high and significant growth. This increased growth is also accompanied by higher volatility. With Japanese technology and cooperation, Central Silk Board has recently been able to evolve & popularize Bivoltine silkworm races which can yield raw silk of international standards thereby increasing production. With these races, we can expect reforms in the marketing and processing of cocoons, India can hope to develop its sale of domestic raw silk beyond its own borders. The declining growth rate is going to affect the silk industry at national and international levels. Production trends are different for different silk types. These are required to be discussed in view of developing strategies for reaching new height of production and to withstand the global competition.

Keywords: Indian silk, Agriculture, sericulture, standards, silk board

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1. Introduction:

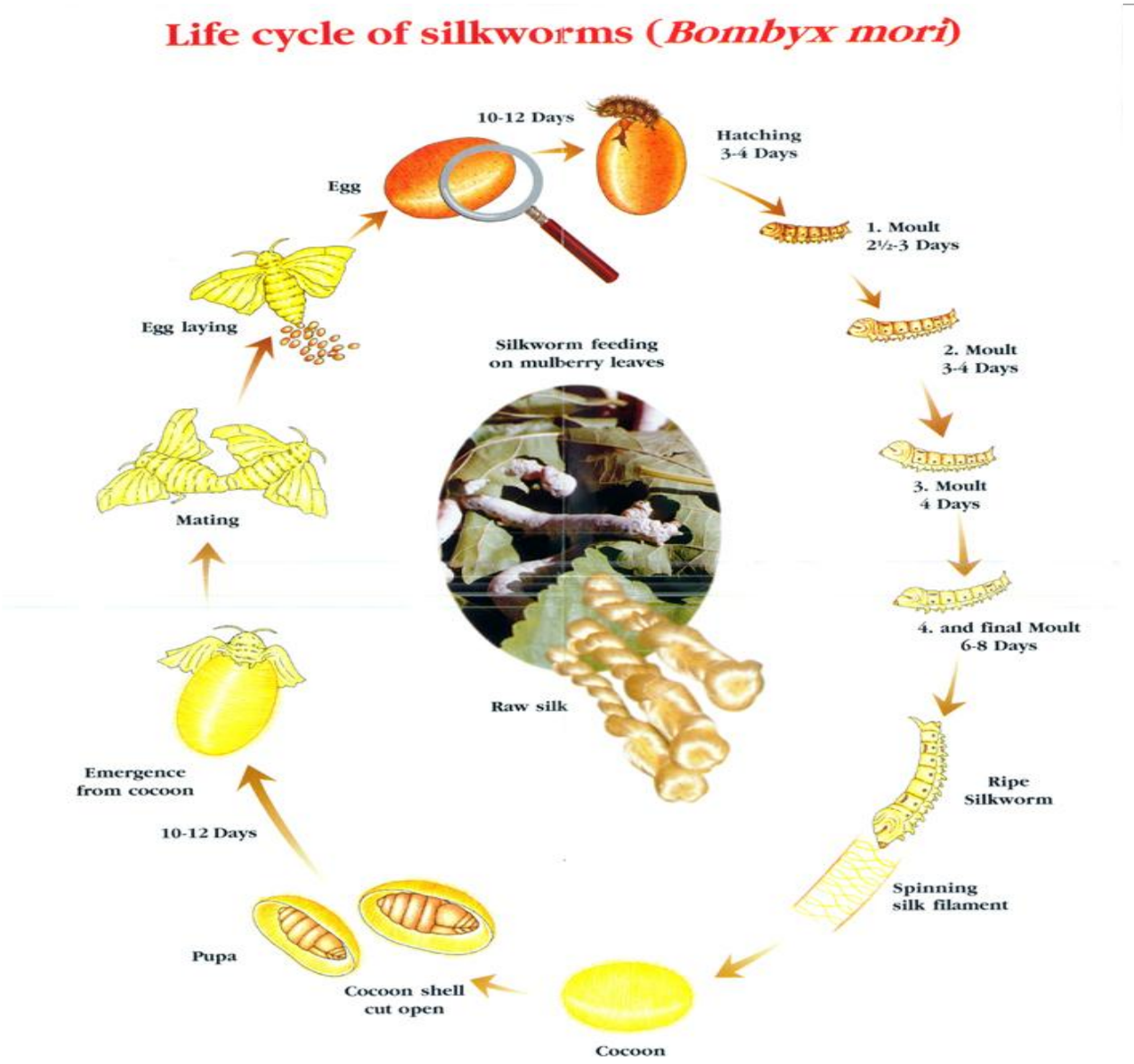
Appearance of silk:

(Silkworm cocoon)

Historically, sericulture was introduced for the first time, into China by Hoshomin, the Queen of China. For a long time, sericulture was considered to be a national secret by the Chinese Government, and as an industry it was not known in other countries. Later, it was introduced into Europe and Japan as well. According to reports available, sericulture was introduced into India about 400 years back and the industry flourished as an agro-industry till 1857, with an annual production of two million pounds of silk fiber. The industry survived the attack of the Pebrine disease during the period from 1857 to 1895. However, after 1928, the sericulture industry showed a decline in its production owing to the fierce competition from advanced subculture countries, such as Japan, China and European countries. After Independence, the industry is flourishing as an agro-industry, giving employment to over 7 million people in the Country.

Detail of an embroidered silk gauze ritual garment from a 4th century BCE, Zhou era tomb at Mashan, Hubei province, China.

The Silk industry has a distinctive position in India, and plays a significant role in Textile Industry and Export. India is the 2nd largest producer of silk in the world with 19690 MT (2008-09) and also the largest consumer of silk in the world and contributes 15% of the total world raw silk production. Geographically, Asia is the main producer of silk in the world and manufactures over 95 % of the total global output. Although there are over 40 countries on the world map of silk, the bulk of it is produced in China and India, followed by Japan, Brazil and Korea. China is the leading supplier of silk to the world with an annual production of 104000 MT (2008), out of which the Mulberry raw silk production is 70980 MT. India produces a variety of silks called Mulberry, Tasar, Muga and Eri[1], based production of raw silk, which is the yarn obtained out of cocoons spun by certain species of insects. The major activities of sericulture comprises of food-plant cultivation to feed the silkworms which spin silk cocoons and reeling the cocoons for unwinding the silk filament for value added benefits such as processing and weaving.



It has a strong tradition and culture bound domestic market of silk. In India, mulberry silk is produced mainly in the states of Karnataka, Andhra Pradesh, Tamil Nadu, Jammu & Kashmir and West Bengal, while the non-mulberry silks are produced in Jharkhand, Chhattisgarh, Orissa and north-eastern states.

2. Literature Review

Luckock and Yeates (1972) considered age, sex, weight and fat thickness in as the factors affecting grading of best carcass in Australia and these carsas is been divided in to age/weight categories on the basis of number of teeth and cartilage.

They found that producers were interested in grading of beef carcass as the grading beef fetched higher prices. Sedky *et al.* (1972) evaluated pineapple grading at farm level. They found that fruits which were harvested were not in uniform either in weight or in the size, but the average weight was found to be 2.33pound and ranging between1.25 and 4.0 pounds and the diameter of the fruits was 4.48.48 inches with a range between 2.33 and 5.75 inches, the average length was 6.19 inches with a range between 4.75 and 8.5 inches fruits was 4.

Yamanaka and Tsuchiya (1978) evaluated the grading methods of fresh fruits, which were used in the marketing system in Japan, Here they applied quantification theory to obtain the data and their finding indicated a very simplified form of grading to improve the efficiency. After that in the year 1979. Agillion and Sardido studied grading and standardization of fruits and this involve classification by size and each was graded according to the general appearance and quality of fruits, But they found that grading practices which was followed in the local market were not uniform and the farmer ,trader were not fully enlightened. To improve the marketing efficiency the procedures has to be revised. There was lot of complaint from the manufacturer that in spite of paying a high price for the raw wool purchased, the raw wool did not match to their expectation. Then the Directorate of Marketing and inspection, which was successfully, implemented the grading of wool for export, could easily handle the present situation without much difficulty.

For wool samples received from the parties could facilitate and enable department officials to know the pattern of business, to collect the statistical data on all the quality factors for framing specifications for grading wool under AGMARK and also to infuse confidence in the trade circle in respect of all those necessary facilities it would not be difficult for the central agency like AGMARK to meet the present challenge.

Hall and Rosenfeld (1982) developed a canonical correlation to find out the economic relevance of quality factor of grain with their prices in North relevance of quality factors of grain with their prices in North-East market of the United States.

The result indicated that damage and foreign mater were economically important quality and the factor which demanded discount in pricing was not that much influencing the price factors which demanded discount pricing. The other drawback of their model was that it did not explain price discount due to moisture availability and due to year by year variability in the degree of utilization.

Takavarsha (1984) in his study on marketing of agricultural products, the economics of statutory grading systems and produces, acceptance standards in the agricultural marketing process, using aggregated time series data for cotton and maize delivered to the respective marketing boards in Zimbabwe by percentage grade composition. During 1973-87, he evaluated the trend and relationship between grade prices, quality grades, inter-grade price differential and the per unit weighed mean volume of the grades delivered during the period. He made a comparison between the rate of increase in grade prices and the corresponding changes in the aggregated weighted, mean value of grades delivered and the impact of inter grade price differential and percentage grade comparisons on the market value of the products concerned. The second changes in the value of the products attributable for quality changes were also examined. He concluded that there were no significantly noticeable gains in returns to producers resulting from quality changes, due to fluctuations in the compositions of grades delivered, and relatively small price differential for superior grades.

3. EXPORT AND IMPORT PERFORMANCE OF SILK

India exports considerable quantity of silk goods and the value of these silk goods is more than 15 per cent of the total raw silk production. India's export includes Dress Materials, Ready-made Garments, Saris and Made-up articles for interior decoration. India's export has adequately progressed during the study period with both quantity and value of export showing high and significant growth. This increased growth is also accompanied by higher volatility. India exports mainly to 10 countries viz., USA, UK, Hong Kong, German People Republic, Italy, France, Spain, Saudi Arabia, UAE and Singapore. The share of total Indian exports to these 10 countries constitutes 80 per cent.

4. INDIAN SERICULTURE INDUSTRY REQUIRES REVIVAL

It is important to look into the real situation in Indian sericulture. All the major commercial silks are produced in the country. However, different races and hybrids of the monophagous silkworm Bombyx Mori produce the major portion of silk in India. The gene pool available in the country can be broadly divided into two groups, low yielding stocks characterized by high adaptability to tropical conditions and highest yielding stocks exhibiting regular diapause, suffer from the low adaptability to the highly variable tropical agro climatic conditions.

To increase productivity and quality of silk there is an urgent need to develop technology suitable for tropical sericulture. Transplanting the technology developed for by the temperate sericulture is neither practical nor economically viable. This is because we have to consider at the same time the agro climatic

conditions where the technology is going to be applied as well as the economic status of the technology user.

Sericulture R&D in India demanded the twin requirement of evolving of high yielding breeds and development of the sericulture technology suitable for it. Since the productivity through better conversion to silk is higher in bivoltine silkworm, the shift to bivoltine sericulture will add to reduction. Recent switching to the high yielding mulberry variety from conventional K2 and CSR2x CSR4 from the multivoltine x Pure Mysore x NB_4D_2 are typical examples, through which productivity increased dramatically.

5. PROBLEMS OF INDIAN SERICULTURE INDUSTRY:

Though sericulture is ideally suited for improving the rural economy of the country, as it is practiced as a subsidiary industry to agriculture, it is hindered by various factors like imports of cheap and alternative textiles from other Asian neighbors, use of outdated manufacturing technology, primitive and unscientific "reeling" and "weaving" techniques, use of poor quality seeds, low production of bivoltine seeds, use of non-graded and diseased seeds, poor knowledge of farm disease amongst farmers, poor supply chain management ,huge unorganized and decentralized sector, high production cost, recurring droughts and increased import of silk from China and accompanied with the following problems like:

- ✓ Price fluctuation
- ✓ Absence of proper market
- ✓ Long distance to market
- ✓ Lack of transport facilities
- ✓ Absence of storage facilities
- ✓ Poor information on market trend
- ✓ Lack of finance

Central Silk Board took up the bivoltine sericulture technology development program (BSTDP: 1991-99) in a bigger way with the cooperation Japan International Cooperation Agency (JICA). R&D was put into full swing to develop various technologies, which were duly tested verified on a multi-location base. Shoot system of mulberry cultivation and rearing, which is extensively followed in Japan, is a notable one. In this method shoot cut along with leaf is fed to the silkworms on large rearing racks instead of the individually picked leaves reducing labor cost by 60%. Following the paired row system it is also possible to partially or fully mechanize the plantation. Separate garden for young age rearing (it is

generally called Chawki rearing) ensures a healthy crop as the early age rearing is very critical from the nutrition and sanitation point of view.

Water is limiting factor in agricultural system. So to conserve it water shed management concepts are hugely introduced. Drip system is followed to maximize the utility of available ground water. Recycling of Seri-waste through composting/ vermi-composting is a value addition while helping to reduce contamination of rearing premises. Inter-cropping with leguminous plants is also recommended to improve fertility of the soil. In put cost is drastically cut by complementing chemical fertigation with use of biofertilisers (Azatobacter and Vesicular Arboscular Micorhizha). About Rs. 5000/- per ha is saved in this way.

There are new technologies developed or adopted in the field of mounting of worms for cocooning, harvesting etc. Examples are those for fast uniform ripening and better cocoon (rotary montage). These may involve high investment initially, but in the long run cost effectively.

In the field of pest and disease management also the developments are noteworthy. Microsporidiosis or Pebrine, which is trans-ovarially transmitted and thus the most serious disease in silkworm is all most fully controlled by the various mother moth examination methods. Even its immune-diagnosis and DNA (through polymerase chain reaction) methods are developed for precise identification of the virulent strains. Some pyramids are already identified as alternate host of the pathogen which opens up scope for further studies in these lines. Flacherie is another serious disease condition, which is actually a complex involving certain non-occluded viruses and bacteria, which act either individually or synergistically. Two major ones are Infectious Flacherie Virus (Bm IFV) and Densonucleosis Virus (Bm DNV). Another viral disease of concern is Nuclear Polyhedrosis or grasserie caused by the BM NPV, and are contained in polyhedra. Among fungal diseases muscardine caused by Beauveria and Metarrhizium; and aspergilosis (agent Aspergil lus) are important.

Current stress on disease management is rather on prevention rather than on control. Proper disinfection using slaked lime, formalin and/or bleaching powder, Chlorine dioxide (500 ppm) are found to be most effective. Rearing rooms, appliances and the premises are to be disinfected thoroughly before the start of the crop. Many rearing bed disinfectants (under the commercial names like Resham Keed Oushad, Resham Jyothi and Vetcare Vijetha) are developed which are very useful in the control/ secondary contamination of various diseases.

Among the pests uzifly, Exorista sorbillans (=bombysis) of silk worm is the major destructor. Other than the conventional use of net various types of traps and chemicals ('Uzicide', Uzipowder) were developed to control the pest. Several natural enemies are also used against uzi, viz., Nesolynx thymus (Giroult), N. dipterae (Hymenoptera: Eulophidae), Exoristobia philippinensis Ashmead (Hymenoptera: Encyrtidae), Dirhinus anthracia Walker (Hymenoptera: Chalcididae). CSR&TI, Mysore has developed a technology to mass multiply and release N. thymus which is found to be very effective in the control of the pest. Some studies involving the use of kairomones is also reported the field application of which is still to be made effective. An IPM package is developed, which along with proper quarantine practices are playing very crucial role in the reduction of spread of the pest.

Although the bivoltine technology is popularized, it is a wide consensus that it is not suitable for all regions and all seasons in India. Moreover, given the higher input cost and the rural situation of sericulture in India the idea of sustainable sericulture are muted. The technologies developed are in a large perspective catering to this aspect also.

6. IMPORTANCE OF REELING SECTOR

Reeling sector is a vital component of sericulture linking the agriculture based activity of cocoon production with the industrial activity of fabric production. Reeling converts the cocoons into raw silk yam. Karnataka contributes about 63% of the silk production of the country and therefore the present study is focused on the silk reeling industry of Karnataka. Silk reeling sector, though provides a vital transformation, appear to be the weakest link owing to its innumerable problems and the limited value addition that takes place. Problems are associated with raw material availability, working capital constraints, marketing and quality related aspects. Reeling sector is input dependent activity and its operations are influenced heavily by three factors viz., cocoon quality, cocoon price and cocoon supply.

However, there has not been adequate thrust on quality due to the absence of quality based price fixation. Absence of quality based pricing has been a major deterrent factor in the pursuit for quality improvement. The seasonality associated with cocoon quality, cocoon supply and price as also the raw silk price almost always determine the fate of reeling activity. Being aware of the limited research done in respect of Indian silk industry, an elaborate literature review in the area of economics and management aspects of the silk industry in general and silk reeling operations in particular, was made. Studies on the economics of reeling operations done in the past indicate negative net revenue for the

reeling units. However, if the reeling industry has survived over the years, it cannot be in spite of the loss.

The industry has to breakeven over a period of time to consolidate the gains, however meager. So, it is worthwhile to study the economics of silk reeling industry over a sufficient period of time that is enough to include a cycle of seasonality, be it with respect to cocoon quality, cocoon availability, cocoon price, raw silk demand or raw silk price. In addition, if the element of uncertainties at varying points of time is included to study their effect on reeling economics, it makes the study more meaningful. It may be noted that, the variations in cocoon price over a period of time are dictated by the seasonality with respect to cocoon supply and demand. With regard to the variations in cocoon price at a given point of time (within a season), price differential between the cocoon lots appears to be largely due to its quality. A study of the inter relationship between cocoon quality, its quantity and price as also raw silk price is important. It is therefore felt that, the relationship between the cost of cocoons, cocoon quality and its productivity, when built into the determination of reeling economics, the analysis will be more realistic.

A study of a typical reeling unit, to unearth the intricacies of operations and decision-making in the light of the volatile situation in the industry forms a pre requisite for a clear understanding of its functioning. Since reeling activity is highly input dependent, ignoring the aspects of the input market dynamics would not yield a holistic perspective of the operations. If one has to study and understand the market dynamics, the attributes of the commodity transacted should be clearly known. The commodity in question here is cocoon. The quality of cocoons does not have a unique expression, either to consider as a variable for studying the relationships in the market or as and input into the production process or as a yardstick for commercial transactions.

7. FINDINGS:

1) Major problem faced by charka reelers is the multi end reelers will get 300 to 400 rupees more per kg when compare to charka and filature silk because quality of multi end is better than Charka and Filature. Where as the price paid for raw materials (cocoons) is same for all reelers.
2) Multi-end reeling process requires minimum space of 30 feet * 40 feet land accommodation. which is not available to more than 90 of the silk reelers in kolar district. Hence the reelers of Filature and charka suggests to reduce the size of Multi end by 50 % . So that it can be easily affordable to small and medium size reelers.
3) Ready market for the charka and filature silk is not available regularly.

4) Charka and Filature reelers are facing financial problems, labour problems ,market problem for sale of their silk manufactured and competition from multi - end reelers who manufactures good quality silk which fetches them 300 to 400 rupees more per kg of silk and also government subsidy.
5) More capital is required the manage the Multiend reeling machinery which is not affordable to majority of the medium and small size reelers.

8. RECOMMENDATIONS:

1) There should be uniform price for both multi end reelers and charka reelers.
2) The government should provide the land required for both charka and filature reelers to start multi end-reeling process which speedup the process of production of silk.
3) Ready market for charkas and filature silk should be made available regularly.
4) The problems faced by the charka and filature reelers has to be addressed by the silk board and agencies supplying silk and sufficient subsidy should be provided by the government.
5) The government should provide the machinery required for reeling at a price afforadable to all the reelers.

9. CONCLUSION

In conclusion, it can be said that India can take up the challenge of production of high quality silk in required quantity to meet the domestic requirement as well as to earn valuable foreign exchange. Measures like the encouragement of additional technological and economic research in the various aspects of sericulture, standardization and quality control of silk and silk products, provision of quality seeds, imparting knowledge among the farmers regarding farm disease and rationalization of marketing and stabilization of prices of silk cocoons and raw silk, it could expand rapidly than ever before. The textile sector is also developed to support the agro system so that optimum value addition is possible. Central Silk Board has recently been able to evolve & popularize hybrid silkworm races which can yield raw silk of international standards thereby increasing production. With these races, we can expect reforms in the marketing and processing of cocoons, India can hope to develop its sale of domestic raw silk beyond its own borders.

10. References

[1] http://agropedia.iitk.ac.in/content/sericulture-industry

[2] Murugesh, Mahaligam and Subramanian (2007), 'Ericulture – A new silk prospect', Pp. 21 – 25.

[3] Murugesh (2007), 'Silk and its non-conventional uses', Kisan world, Pp.21 – 24

[4] Margaret Melrose, (2006) "Trying to make a silk purse from a sow's ear? A comment on the government's prostitution strategy", Safer Communities, Vol. 5 Iss: 2, pp.4 - 13

[5]Ravindra Kumar Dr. (2008), 'History of silk and its prospects in Jharkhand', Kurukshetra, Pp.41 -45.

[6] Dr.R.Anitha, EXCEL International Journal of Multidisciplinary Management Studies Vol.1 Issue 3, December 2011, ISSN 2249 8834

[7]K.C. Harrison, (1998) "Silk Stalkings: More Women Write of Murder", Reference Reviews, Vol. 12 Iss: 7, pp.26 - 27

[8] Murugesh Muthuswami and Subramanian (2006) "Silk Production In India "Kisan World Pp.23-24

[9] Krisnaswami, S, Madhava Rao, S. K. Suryanarayan and T. S. Sundaramurthy (1972).Sericulture Manual 3-silk reeling. FAO. Agricultural Services Bulleting 15/122pp.

[10] Miao, Y.(2002). Conservation Status of mulberry genetic resources in China. Expert Consultation of Global Exchange of Sericulture germplasm.Satellite Meeting of xix ISC Congress, September 21st - 25th

[11] Ullal,S. R. and Narasimhanna, M.N.(1987). Hand Book of Practical Sericulture. Central Silk Board Bangalore, India. 166pp.

[12] Global Silk Scenario (2001).Proceedings of International Congress on Tropical Sericultural Practices ,Bangalor, India pp. 121-130.

[13] Gu, G. D. (1999). Study on the output of cocoon and raw silk and distribution of sericultural areas in the world. Sericulture Science 25, 105-114.

[14] He, J. H. (2010). Silk is China and China is Silk. A response to Good et al. (2009). Achaeametry, University of Oxford 1475-4754.

[15] Source: http://www.deccanherald.com/content/45585/reelers-complain-toxic-silk.html

[16] Source: texmin.nic.in/.../Fibre_Policy_Sub_%20Groups_Report_dir_mg

[17] Source: www.roionline.org/uploads/ROI_2010_Silk

[18] Source: http://www.indiankanoon.org/doc/1809930/

11. Annexures:

TABLE NO.1 PRODUCTION OF RAW SILK IN INDIA (IN METRIC TONES)

Years	Mulberry	% to total	Tasar	% to total	Eri	% to total	Muga	% to total	Total
1990-00	13944	91.65	211	1.39	974	6.40	85	0.56	15214
2000-01	14432	91.01	237	1.49	1089	6.87	99	0.62	15857
2001-02	15842	91.30	249	1.44	1160	6.69	100	0.58	17351
2002-03	14617	89.57	284	1.74	1316	8.06	102	0.63	16319
2003-04	13970	88.74	315	2.00	1352	8.59	105	0.67	15742
2004-05	14620	88.61	322	1.95	1448	8.78	110	0.67	16500
2005-06	15445	89.25	308	1.78	1442	8.33	110	0.64	17305
2006-07	16525	89.45	350	1.89	1485	8.04	115	0.62	18475

Source: CSB, Bangalore (In Metric tones)

CHART SHOWING PRODUCTION OF RAW SILK IN INDIA (IN METRIC TONES)

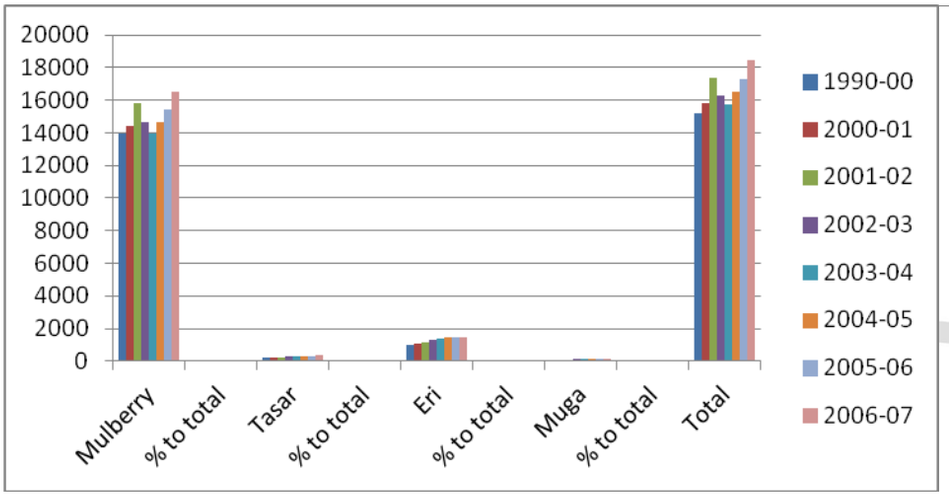


TABLE NO. 2: EXPORT OF SILK FROM INDIA

Year	Exports (Rs)	Trend value (Rs)
1997-98	1006.43	1422.85
1998-99	999.45	1593.74
1999-00	1755.55	1764.64
2000-01	2421.98	1935.53
2001-02	2359.56	2106.43
2002-03	2294.05	2277.32
2003-04	2779.19	2448.22
2004-05	2879.56	2619.11
2005-06	3194.20	2790.01
2006-07	3338.35	2960.90
2007-08	2727.87	2121.80
2008-09	3178.19	3302.69
2009-10	2892.44	3473.59
2010-11		3644.48
2011-12		3815.38
2012-13		3986.27
2013-14		4157.17

Source: CSB, Bangalore

CHART SHOWING EXPORT OF SILK FROM INDIA