Original Research Article

FROM MULBERRY FIELDS TO SILK MILLS: AN INSIGHTFUL STUDY OF INDIA'S SERICULTURE DYNAMICS

ABSTRACT

India is the second largest producer of silk with 36,453 MT (2022-23) after China and also the largest consumer of silk in the world. Asia is the main producer of silk in the world and produces over 95 per cent of the total global output. 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, Chattisgarh, Orissa and North-Eastern states. Much of silk exports earnings is from silk garments, silk carpets and silk wastes, which is about 1,773.38 crore Rs. in total in 2022–23. Mulberry is the largest contributor to the total raw silk production with the compound annual growth rate of 3.09 per cent at 1 per cent level of significance. Tasar silk production registered highest growth rate of 13.67 per cent at 1 per cent level of significance and Jharkhand is the majorcontributor of about 80 per cent for the total tasar silk production. Karnataka is the leading producer of mulberry silk whereas Assam is currently the largest producer of Vanyasilk. Telangana registered a highest compound annual growth rate of 21.1 per cent at 1 per cent level of significance followed by Maharashtra (16.9%). Ramanagara is having highest area under mulberry (20804.56hectares) followed by Chikkaballapura (20544.62hectares) and Kolar (19907.79hectares) in Karnataka.

Key words: Silk mark, Mulberry, silk garments, CAGR, CDVI, Export, GI tags

INTRODUCTION

The word sericulture is derived from the Greek word "Sericos". "Seri" means silk and "Cos" means culture. The rearing of silk worm for production of silk is called as sericulture. Silk is a natural fibre made from silkworm cocoon. It mainly consists of two proteins, i.e., fibroin (80%) and sericin (20%). Silk is the most elegant textile in the world with unparalleled grandeur, natural sheen, and inherent affinity for dyes, high absorbance, light weight, soft touch and high durability and known as the "Queen of Textiles" and because of its strength it is also known as "Biosteel". On the other hand, it stands for livelihood opportunity for millions owing to high employment oriented, low capital intensive and remunerative nature of its production. The very nature of this industry with its rural based on-farm and off-farm activities andenormous employment generation potential has attracted the attention of the planners and policy makers to recognize the industry among one of the most appropriate avenues for socio-economic development of a largely agrarian economy like India.

Silk has been intermingled with the life and culture of the Indians. India has a rich and complex history in silk production and its silk trade dates back to 15th century. Sericulture industry provides employment to more than 9 million people across 51,000 villages, who operate 3,28,627 handlooms and

45,867 power looms with 8,14,616 weavers in rural and semi-urban areas in India. Of these, a sizeable number of workers belong to the economically weaker sections of society, including women. 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.

Asia is the main producer of silk in the world and produces over 95 per cent of the total global output. Though there are over 40 silk producing countries on the world map, bulk of it is produced in China and India. India is the second largest producer of silk with 36,453 MT (2022-23) after China and also the largest consumer of silk in the world. It has a strong tradition and culture bound domestic market of silk. Major producers of silk include China, India, Uzbekistan, Brazil, Japan, North Korea, Thailand, Vietnam, Iran, etc and the major consumers are USA, Italy, Japan, India, France, China, UK, Switzerland, Germany, UAE, Korea, etc.

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, Chattisgarh, Orissa and North-Eastern states.

METHODOLOGY

The present study is based on secondary data. The secondary data on production of silk and year-wise and country-wise exports and imports of silk in terms of quantity and value were collected from various published sources like international sericulture commission, Indiastat, central silk board and Karnataka state department of sericulture.

COMPOUND GROWTH RATE ANALYSIS

The growth rate of the production of silk in India and Karnataka was calculated using the CAGR method (Manjunatha *et al.*, 2019). Further the compound growth rate analysis was carried out. The compound growth function was specified in the following formula.

$$Yt = ABt\ Ut \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,

Yt = number/production/productivity in the year t

A = Intercept indicating Y in the base period (t=0)

B = 1 + g

ti = Time period (i = 1 to 9)

Ut = Error term

g = Compound annual growth rate

Equation (1) was converted into the logarithmic form in order to facilitate the use of linear regression.

Taking logarithms on both sides,

$$LnYt = LnA + t\,(Ln\,B) + Ln\,Ut \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

or

$$Qt = a + bt + ut$$

Where,

Qt = Ln Yt

a = Ln A

b = Ln B

t = Time

Ut = Ln Ut

The values of 'a' and 'b' were estimated by using Ordinary Least Square estimation technique. Later, the original 'A' and 'B' parameters in equation (1) were obtained by taking anti-logarithms

of 'a' and 'b' values as;

A = Anti Ln a

B = Anti Ln b

Compound annual growth rate was calculated as;

B = 1 + g

g = B – 1

INSTABILITY ANALYSIS

In this study, the instability was estimated by using Cuddy-Della Valle Index (CDVI). Though coefficient of variation (CV) is commonly used for estimating the dispersion for comparison across various units, it cannot be used in case of time series data characterized by time trend (Sen, 1989). Any measure of instability needs to exclude the deviations in the data series that may arise due to secular trend or growth. CDVI was originally developed by John Cuddy and Della Valle for measuring the instability in time series data that is characterized by trend. The estimable form of the equation is as follows:

$$CV \times \sqrt{1 - R^2}$$

Where, CV is coefficient of variation; R^2 is coefficient of determination from time trend regression adjusted by number of degrees of freedom.

RESULTS

Table 01: Production of silk in the world

Year	Production (Metric tonnes)
2015	1,78,043.9
2016	2,02,072.3
2017	1,92,512.3
2018	1,77,507.4
2019	1,59,648
2020	1,09,107
2021	91,765
2022	86,311
CAGR (%)	**-12.1*** **
CDVI	**13.87**

***Significant at 1% level of significance

Source : International Sericulture Commission, 2022

Table 01 represents the total raw silk production in the world from 2015 to 2022 with a negative compound annual growth rate of 12.1 per cent which is significant at 1 per cent level of significance. This is 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. Cuddy Della Valle Instability Index was found to be 13.87 and it indicates the low instability in global silk production. As of 2021-22, globally 86,311 metric tonnes of raw silk were produced.

Table 02: Country wise silk production in the world over the years (2015-2022)

(in metric tonnes)

Year	China	India	Uzbekistan	Thailand	Brazil	Vietnam	North Korea	Iran	Bangladesh	Turkey	Others	TOTAL
2015	146000	28708	1100	692	560	420	320	110	44.5	32	57.41	178043.9
2016	170000	28523	1200	698	600	450	350	120	44	30	57.33	202072.3
2017	158400	30348	1256	712	650	523	365	125	44	32	57.27	192512.3
2018	142000	31906	1200	680	600	520	365	120	41	30	45.35	177507.4
2019	120000	35261	1800	680	650	680	350	110	41	30	46	159648

2020	68600	35820	2037	700	469	795	370	227	41	5	43	109107
2021	53358	33770	2037	520	377	969	370	270	41	5	48	91765
2022	46700	34903	2037	503	373	1067	370	272	41	5	40	86311
CAGR (%)	-17.8***	3.4***	11.1***	-4.4**	-7.0**	15.2***	1.6**	15.5***	-1.3***	-27.9***	-4.9***	-12.1***
CDVI	18.64	4.56	11.01	9.04	14.72	7.03	3.45	24.07	2.16	35.72	7.60	13.87

***Significant at 1% level of significance and **Significant at 5% level of significance

Source : International Sericulture Commission, 2022

Table 02 represents global country wise raw silk production from 2015 to 2022. India and China are the major contributors of world mulberry raw silk and other countries together contribute less than 5% to world mulberry raw silk production. Silk production in the countries like China, Thailand, Bangladesh, Turkey is declining 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. Cuddy Della Valle Instability Index was found to be low in case of India (4.56), Uzbekistan (11.01), Thailand (9.04), Brazil (14.72), Vietnam (7.03), North Korea (3.45), Bangladesh (2.16) and it indicates less instability. CDVI of China and Iran was found to be medium and it indicates medium instability but in case of Turkey CDVI was found to be high and it indicates high instability in silk production.

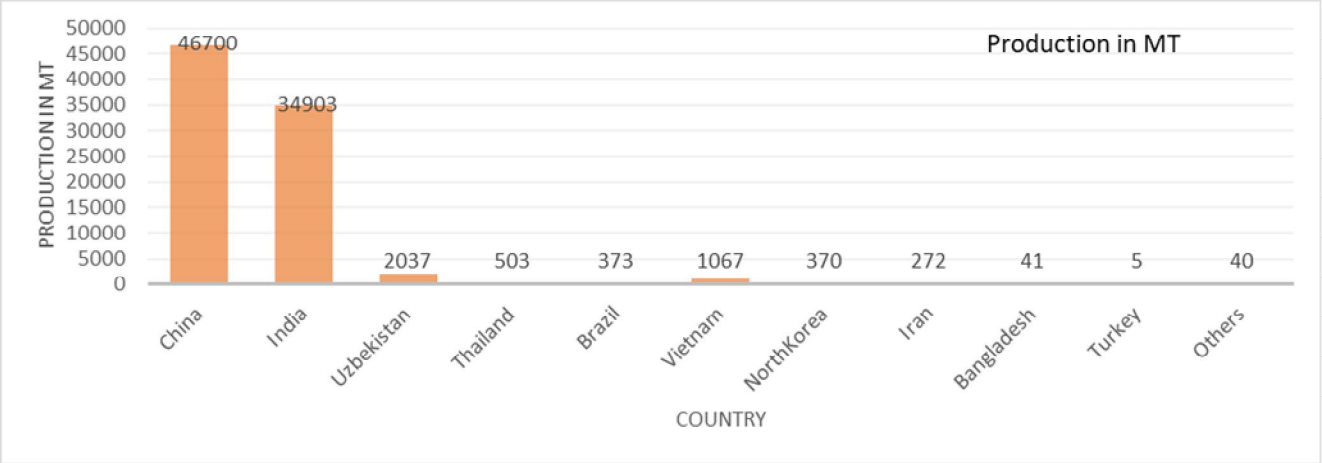

Fig 01: Trend in Country wise silk production in World during 2022

Above figure 01, represent the trends in global country wise silk production during 2022. China contributes more to the world mulberry raw silk production i.e., 46,700 metric tonnes followed by India (34,903 metric tonnes). India and China together contribute more than 90 per cent of world raw silk production.

Table 03 : Comparative mulberry sericulture statistics - China vs India

Particulars	CHINA	INDIA
Area under mulberry (ha.)	6,26,000	2,42,000
Races reared	All bivoltine	Mostly cross breeds
Egg production (crore dfls)	80.9	35.6
Supply system	Majority chawki reared	Majority supplied as eggs
Raw silk produced (MTs)	46,700	34,903
Avg. crop loss / year (%)	3-5	10-15
No. of crops per year	2-3: Temperate 6-8: Tropical	6-8
Filament length (m)	>1000	<1000
Cocoon weight (g)	1.9-2.0	1.6-1.8

Source: International Sericulture Commission, 2022

Table 03 represents the comparative sericulture statistics between China and India. 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. 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.

Table 04: Area under mulberry plantation in India

Year	Mulberry plantation (in '000 ha)
2000-01	216
2001-02	232
2002-03	194
2003-04	185
2004-05	172

2005-06	179
2006-07	192
2007-08	185
2008-09	178
2009-10	184
2010-11	170
2011-12	181
2012-13	186
2013-14	203
2014-15	220
2015-16	209
2016-17	217
2017-18	224
2018-19	235
2019-20	240
2020-21	238
2021-22	242
2022-23	253
CAGR (%)	**1.04*** **

***Significant at 1% level of significance

Source: Indiastat, 2023

Table 04 represents area under mulberry plantation in India over the years from 2001 to 2023. Area under mulberry increasing over the years with the compound annual growth rate of 1.04 per cent at 1 per cent level of significance. This is due to that sericulture generating more income than other cash crop like paddy, wheat, Gram, Mustard and Maize etc. Most of the crops can be grown once or twice a year but sericulture can be practiced 4-5 times in a year. Sericulture provides regular employment to the farmers which ultimately check the migration of population from rural areas to urban areas. Hence area under mulberry increasing. Cuddy Della Valle Instability Index was found to be 10.02 and it indicates the low instability.

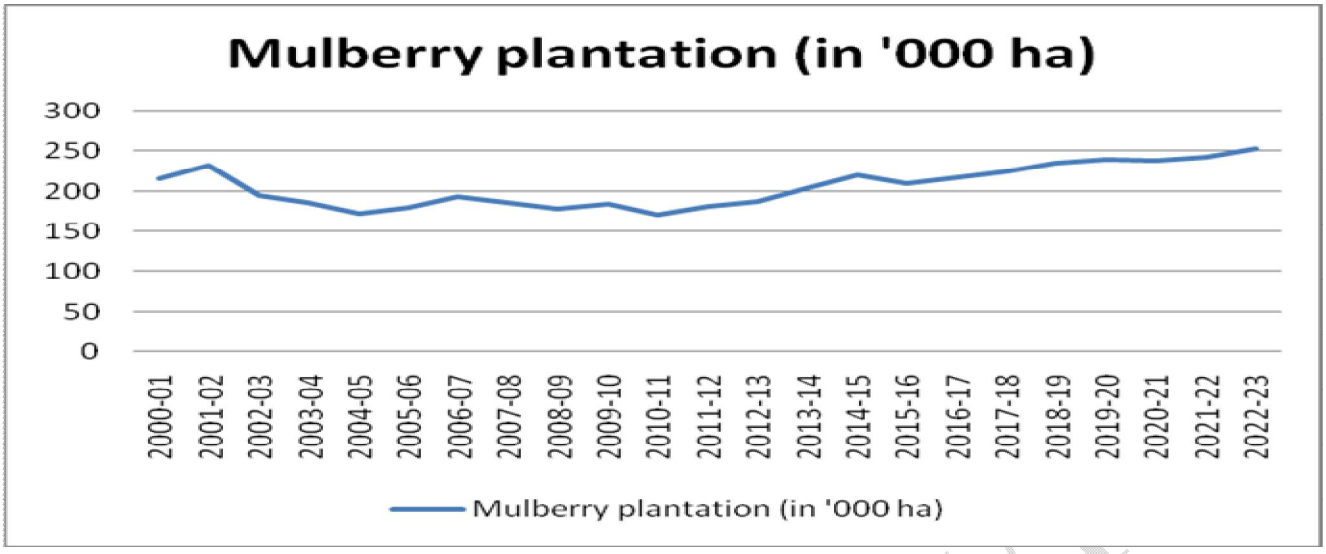

Fig 02: Trend in area under mulberry plantation in India over the years (2000-01 to 2021-22)

Above figure 02 represents increasing trends in area under mulberry in India from 2001 to 2023. Area under mulberry in India during 2023 is 2,53,000 hectares.

Table 05: State wise area under mulberry cultivation in India over the years (2016-17 to 2021-22)

(in hectares)

SN	State	2016-2017	2017-2018	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR (%)	CDVI
1	Karnataka	87,600	92,122	98,135	1,04,578	1,06,384	1,08,019	1,12,658	**4.40*** **	**2.32**
2	Andhra Pradesh	29,829	32,822	36,638	41,915	44,607	50,731	54,971	**10.10*** **	**2.60**
3	Tamil Nadu	16,160	19,176	18,854	20,128	23,268	20,121	22,678	**3.40**	**11.98**
4	West Bengal	15,500	15,892	16,480	15,400	15,734	16,498	16,728	**0.04**	**2.70**
5	Jammu and Kashmir	8,237	8,304	8,104	8,183	8,183	6,535	6,853	**-0.20**	**0.82**
6	Maharashtra	3,947	3,474	4,327	7,913	7,154	5,962	5,549	**15.90***	**22.39**
7	Telangana	2,509	2,664	3,517	4,383	4,770	5,562	6,272	**16.90*** **	**7.35**
8	Uttarakhand	2,974	3,029	3,197	3,305	3,478	3,798	3,918	**4.40*** **	**1.16**
9	Uttar Pradesh	4,200	5,680	4,044	3,754	3,712	3,600	3,858	**-5.70**	**15.44**
10	Himachal Pradesh	2,088	2,135	2,454	2,743	3,183	4,687	3,463	**11.60*** **	**3.52**
	Others	35,906	37,782	28,177	22,699	19,490	16,764	16,234	**-14.60*** **	**9.07**
	INDIA	2,08,950	2,23,080	2,23,927	2,35,001	2,39,963	2,42,277	2,53,182	**2.60*** **	**2.10**

***Significant at 1% level of significance and *Significant at 10% level of significance

Source: Indiastat, 2022

Table 05 represents state wise area under mulberry in India over the years from 2017 to 2023. Telangana registered highest compound annual growth rate of 16.9 per cent at 1 per cent level of significance followed by Maharashtra (15.9%). Karnataka is having significant positive growth rate of 4.4 per cent at 1 per cent level of significance. This is due to suitable climate, suitable soil, assured irrigation facility, availability of mulberry plants nurseries. Jammu and Kashmir and Uttar Pradesh is having negative growth rate due to monocropping and low leaf production from age old plants of inferior genetic stock. Cuddy Della Valle Instability Index was found to be low in case of Karnataka (2.32), Andhra Pradesh (2.60), Tamil Nadu (11.98), West Bengal (2.70), Jammu and Kashmir (0.82), Telangana (7.35), Uttarakhand(1.16), Himachal Pradesh (3.52) and it indicates less instability. CDVI of Maharashtra (22.39) and Uttar Pradesh (15.44) was found to be medium and it indicates medium instability in mulberry plantation area in India.

Table 06: Production of reeling cocoons in India over the years (2001 to 2022)

Year	Reeling cocoons (in '000 Tonnes)
2000-01	125
2001-02	140
2002-03	128
2003-04	117
2004-05	120
2005-06	126
2006-07	135
2007-08	135
2008-09	125
2009-10	132
2010-11	131
2011-12	140
2012-13	144
2013-14	143
2014-15	159
2015-16	152
2016-17	156
2017-18	162
2018-19	186
2019-20	185
2020-21	169
2021-22	178
2022-23	187
CAGR (%)	**1.98*** **
CDVI	**6.94**

***Significant at 1% level of significance

Source: Central Silk Board, Bengaluru

Table 06 represents the production of reeling cocoons in India over the years from 2001 to 2023. Theproduction of reeling cocoons in India increasing over the years with the compound annual growth rate of

1.98 per cent at 1 per cent level of significance. 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 to increase the production over the years. Cuddy Della Valle Instability Index was found to be 6.94 and it indicates the low instability in production of reeling cocoons in India over the years from 2001 to 2023.

Table 07: Production (in metric tonnes) of Raw silk in India (2000-01 to 2021-22)

Year	Mulberry	% share	Tasar	% Share	Eri	% Share	Muga	% share	Total
2000-2001	14,432	91.0	237	1.5	1,089	6.9	99	0.6	15,857
2001-2002	15,842	91.3	249	1.4	1,160	6.7	100	0.6	17,351
2002-2003	14,617	89.6	284	1.7	1,316	8.1	102	0.6	16,319
2003-2004	13,970	88.7	315	2.0	1,352	8.6	105	0.7	15,742
2004-2005	14,620	88.6	322	2.0	1,448	8.8	110	0.7	16,500
2005-2006	15,445	89.3	308	1.8	1,442	8.3	110	0.6	17,305
2006-2007	16,525	89.4	350	1.9	1,485	8.0	115	0.6	18,475
2007-2008	16,245	88.7	428	2.3	1,530	8.4	117	0.6	18,320
2008-2009	15,610	85.0	603	3.3	2,038	11.1	119	0.6	18,370
2009-2010	16,322	82.9	803	4.1	2,460	12.5	105	0.5	19,690
2010-2011	16,360	80.2	1,166	5.7	2,760	13.5	124	0.6	20,410
2011-2012	18,272	79.2	1,590	6.9	3,072	13.3	126	0.5	23,060
2012-2013	18,715	79.0	1,729	7.3	3,116	13.2	119	0.5	23,679
2013-2014	19,476	73.5	2,619	9.9	4,237	16.0	148	0.6	26,480
2014-2015	21,390	74.5	2,434	8.5	4,726	16.5	158	0.6	28,708
2015-2016	20,478	71.8	2,819	9.9	5,060	17.7	166	0.6	28,523
2016-2017	21,273	70.1	3,268	10.8	5,637	18.6	170	0.6	30,348
2017-2018	22,066	69.2	2,988	9.4	6,661	20.9	192	0.6	31,906
2018-2019	25,344	71.5	2,981	8.4	6,910	19.5	233	0.7	35,468
2019-2020	25,239	70.5	3,136	8.8	7,204	20.1	241	0.7	35,820
2020-2021	23,896	70.8	2,689	8.0	6,946	20.6	239	0.7	33,770
2021-2022	**25,818**	**74.0**	**1,466**	**4.2**	**7,364**	**21.1**	**255**	**0.7**	**34,903**
2022-2023	**27,654**	**75.5**	**1,318**	**3.6**	**7,349**	**20.0**	**261**	**0.7**	**36,582**
CAGR (%)	**3.09*** **		**13.67*** **		**10.88*** **		**5.03*** **		**4.64*** **
CDVI	**6.28**		**30.36**		**11.25**		**12.96**		**7.55**

***Significant at 1% level of significance

Source: Central Silk Board, Bengaluru

Table 07 depicting the production of raw silk (both mulberry and non-mulberry silks) in India over the years from 2001 to 2023. Mulberry is the largest contributor to the total raw silk production with the

compound annual growth rate of 3.09 per cent at 1 per cent level of significance. Tasar silk production registered highest growth rate of 13.67 per cent at 1 per cent level of significance and Jharkhand is the majorcontributor of about 80 per cent for the total tasar silk production. Cuddy Della Valle Instability Index was found to be 30.36 for tasar silk production and it indicates the high instability and for mulberry silk (6.28),eri silk (11.25) and muga silk (12.96) was found to be low and it indicates low instability.

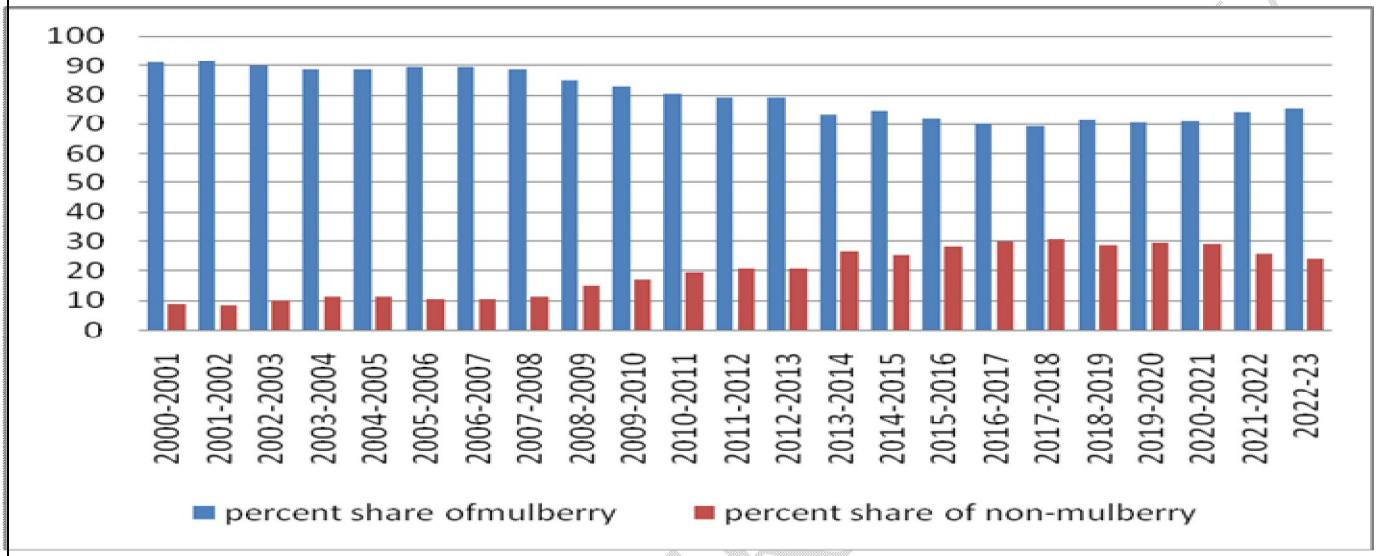

Fig 03: Trend in percentage share of mulberry and non-mulberry silk production in India over theyears (2000-01 to 2022-23)

Table 08: State wise raw silk production (Mulberry + Vanya) in India over the years

(In metric tonnes)

SN	State	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	CAGR (%)	CDVI
1	Karnataka	8,574	9,645	9,823	9,571	9,322	11,592	11,143	11,292	11,191	**11823**	**3.4*** **	**5.86**
2	Andhra Pradesh	6,912	6,485	5,086	5,970	6,779	7,481	7,962	8,422	8,834	**9312**	**4.9** **	**11.86**
3	Assam & Bodoland	2,766	3,222	3,325	3,811	4,861	5,026	5,316	5,462	5,700	**5721**	**9.9*** **	**7.00**
4	Tamil Nadu	1,120	1,602	1,898	1,914	1,984	2,072	2,154	1,834	2,373	**2589**	**6.4** **	**12.55**
5	West Bengal	2,079	2,500	2,391	2,565	2,577	2,394	2,295	872	1,632	**1966**	**-6.9**	**23.25**
6	Meghalaya	644	656	857	927	1,089	1,187	1,192	1,213	1,234	**1168**	**9.33*** **	**8.8**
7	Jharkhand	2,003	1,946	2,284	2,631	2,220	2,375	2,402	2,185	1,052	**874**	**-3.6**	**21.06**
8	Maharashtra	122	221	274	259	370	519	428	428	523	**620**	**16.9*** **	**18.18**
9	Manipur	487	516	519	529	389	464	504	327	462	**454**	**-2.9**	**13.34**
10	Telangana	99	101	116	119	163	224	297	309	404	**462**	**21.1*** **	**12.59**
	Others	1,775.33	1,814.33	1,951.44	2,052	2,187.33	2,133.11	2,128	1,425.08	1,498.28	**1593**	**-1.97**	**14.83**
	TOTAL	**26,581.33**	**28,708.33**	**28,524.44**	**30,348**	**31,941.33**	**35,467.11**	**35,821**	**33,769.11**	**34,903.33**	**36582**	**3.7*** **	**4.54**

***Significant at 1% level of significance and **Significant at 5% level of significance

Source: Indiastat, 2023

Table 08 represents the state wise raw silk production in India over the years from 2014 to 2023. Karnataka is the leading producer of mulberry silk whereas Assam is currently the largest producer of Vanyasilk. Telangana registered a highest compound annual growth rate of 21.1 per cent at 1 per cent level of significance followed by Maharashtra (16.9%). Karnataka is having positive significant growth rate of 3.4 per cent at 1 per cent level of significance. Cuddy Della Valle Instability Index was found to be low in case of Karnataka (5.86), Andhra Pradesh (11.86), Assam & Bodoland (7.00), Tamil Nadu (12.55), Meghalaya (8.8), Telangana (12.59), and it indicates less instability. CDVI of West Bengal (23.25) and Jharkhand (21.06) was found to be medium and it indicates medium instability in raw silk production in India from 2014 to 2023.

Table 09: Export earnings from silk and silk goods

Year	**Crore (Rs.)**
2015-16	2,495.98
2016-17	2,093.42
2017-18	1,649.48
2018-19	2,031.88
2019-20	1,745.65
2020-21	1,466.60
2021-22	1,848.96
2022-23	1,773.38
CAGR (%)	**-5.4*** **
CDVI	**15.12**

***Significant at 1% level of significance

Source : International Sericulture Commission, 2023

Table 09 represents the export earnings from silk and silk goods over the years from 2016 to 2023. Over the years export earnings decreasing with the negative growth rate of 5.4 per cent at 1 per cent level of significance due to less supply compare to the domestic demand and due to global recession and reduction in demand for silk goods in western countries (Western Europe and the USA, which are the major consumers of silk goods) and hence hampers the export growth. Much of silk exports earnings is from silk garments, silk carpets and silk wastes. Cuddy Della Valle Instability Index was found to be 15.12 and it indicates the low instability in export of silk and silk goods in India over the years from 2016 to 2023.

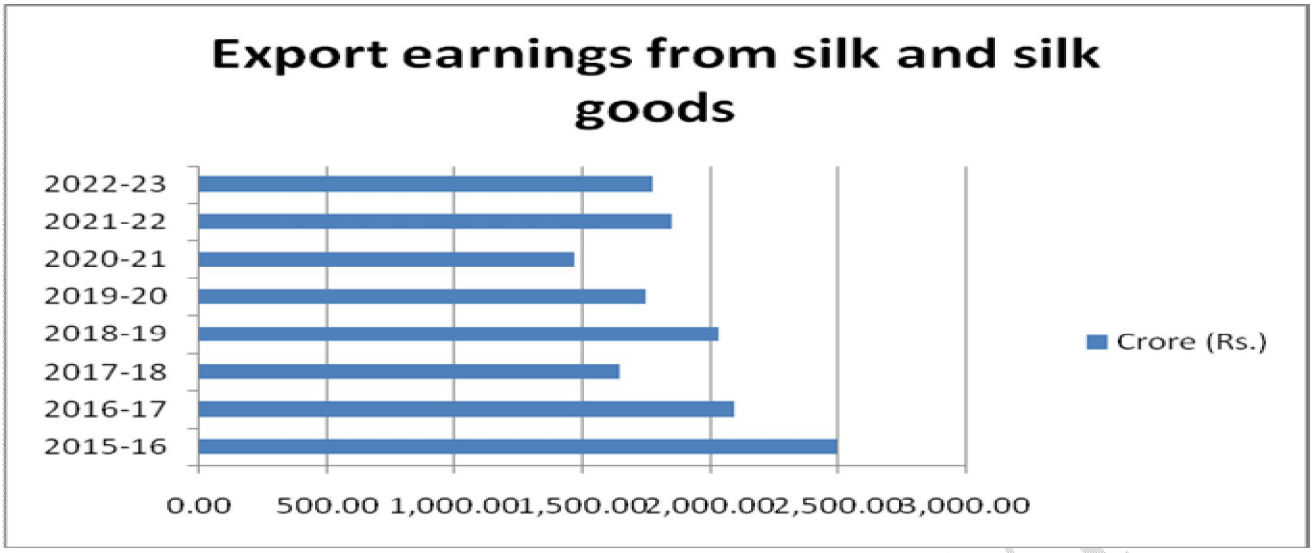

Fig 04: Trend in export earnings from silk and silk goods (2015-16 to 2022-23)

Table 10: Import of silk and silk goods

Year	Quantity (MT)	Value (Crore Rs.)
2014-15	3,489	970.82
2015-16	3,529	1,006.16
2016-17	3,795	1,092.26
2017-18	3,712	1,218.14
2018-19	2,785	1,041.35
2019-20	3,315	1,149.32
2020-21	1,804	570.56
2021-22	1,978	1,143.59
2022-23	3,874	2,284.59
CAGR (%)	**-9.52****	**0.41****
CDVI	**16.49**	**19.74**

**Significant at 5% level of significance

Source : International Sericulture Commission, 2023

Table 10 represents the import of silk and silk goods both in quantity and value over the years from 2016 to 2023. The import both in terms of quantity and value showing declining trend with the negative growth rate of 9.52 per cent for quantity and positive growth of 0.41 per cent for value. This is due to increased custom duty on imports from 10 per cent to 15 per cent on imported raw silk and due to imposition of anti-dumping policy on imported low priced goods. Cuddy Della Valle Instability Index was found to be 16.49 for quantity import and 19.74 for value of import and it indicates the medium instability in

import of silk and silk goods in India over the years from 2015 to 2023.

Table 11: Mulberry area, seed production, cocoon production and silk production in Karnataka(2008-09 to 2022-23)

Year	Mulberry plantation area (ha.)	Seed production (inlakhs)	Cocoon production(MT)	Silk production (MT)
2008-09	77,329	943	53,377	7,238
2009-10	82,078	891	54,282	7,360
2010-11	62,692	821	52,709	7,338
2011-12	70,958	759	55,957	7,796
2012-13	74,128	647	49,441	7,063
2013-14	82,229	1,049	61,419	8,574
2014-15	88,489	1,229	68,759	9,645
2015-16	87,598	1,260	70,436	9,823
2016-17	91,492	1,151	68,381	9,697
2017-18	98,135	1,193	66,180	9,322
2018-19	1,04,578	1,322	83,017	11,592
2019-20	1,06,384	1,296	79,701	11,143
2020-21	1,07,472	1,219	80,396	11,292
2021-22	1,08,018	1,219	79,462	11,191
2022-23	1,15,818	1,194	83,899	11,823
CAGR (%)	**3.9*** **	**3.9*** **	**4.1*** **	**4.2*** **
CDVI	**7.87**	**14.40**	**7.44**	**6.65**

***Significant at 1% level of significance

Source: Karnataka State Department of Sericulture, 2023

Table 11 represents the mulberry plantation area, seed production, cocoon production and silk production in Karnataka over the years from 2009 to 2023. Area under mulberry increasing over the years with the compound annual growth rate of 3.9 per cent at 1 per cent level of significance due to technological innovations and incentives provided by government for expansion of sericulture. Cocoon production and silk production increasing over the years with the compound annual growth rate of 4.1 per centand 4.2 per cent respectively at 1 per cent level of significance due to introduction of improved varieties of mulberry, high yielding silkworm breeds etc. Cuddy Della Valle Instability Index was found to be 7.87 for mulberry area, 14.40 for seed production, 7.44 for cocoon production and 6.65 for silk production and it indicates the low instability over the years from 2009 to 2023.

Table 12: District wise cocoon production, silk production and mulberry area in Karnataka (2022-23)

SN	Districts	Cocoon production(MT)	%	Silk production(MT)	%	Mulberry area(Ha)	%
1	Mandya	25514.31	30.63	3580.51	30.28	17944.43	15.93
2	Ramanagara	18466.33	22.17	2582.30	21.84	20804.56	18.47
3	Chikkaballapura	12358.12	14.83	1725.34	14.59	20544.62	18.24
4	Kolar	9158.07	10.99	1292.36	10.93	19907.79	17.67
5	Bengaluru rural	3656.21	4.39	512.90	4.34	5169.93	4.59
6	Tumkur	3085.42	3.70	457.95	3.87	4859.28	4.31
7	Bengaluru urban	1159.84	1.39	170.50	1.44	1202.77	1.07
8	Haveri	1610.26	1.93	247.71	2.10	2613.73	2.32
9	Vijayanagar	1312.79	1.58	201.94	1.71	2616.71	2.32
10	Mysore	1212.17	1.46	183.00	1.55	2258.98	2.01
11	Others	5566.27	6.68	847.53	7.17	13577.21	12.05
12	Mysore seed production area(Pure Mysore)	210.19	0.25	21.01	0.18	1158.18	1.03
	Total	83309.98	**100.00**	11823.05	**100.00**	112658.19	**100.00**

Source: Karnataka State Department of Sericulture, 2023

Table 12 represents district wise cocoon production, silk production and mulberry area in Karnataka during 2022-23. Ramanagara is having highest area under mulberry (20804.56hectares) followed by Chikkaballapura (20544.62hectares) and Kolar (19907.79hectares). Mandya ranks first in silk production (3580.51metric tonnes) followed by Ramanagara (2582.30metric tonnes) and Chikkaballapura (1725.34 metric tonnes).

CONCLUSION

India is the unique country in the world where all four varieties of silk are produced. Sericulture is the more lucrative and low investment agro-based enterprise (Soundarya *et al,* 2022). Prevailing favourable agro-climatic conditions in silk producing areas and participation of large number of women (60%) in sericulture industry will lead the development of silk industry to a greater height. Training and assistance with the provision of quality certified seeds and silk products through the schemes like Silk Samagra and Silk Mark could expand the production and fetch better price for the farmer. Finally, it can be concluded that India can take up the challenge of production of high quality silk in required quantity in order to meet the domestic requirement as well as to earn valuable foreign exchange through export of quality silk and silk products.

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