DEVELOPMENT OF SERICULTURE INDUSTRY IN HIMACHAL PRADESH

Planning Department, H.P.

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PREFACE

Sericulture in Himachal has a long historical background. Although, the state is not a large producer of silk, yet it has been registered its presence in the country for its quality silk. Sericulture is developing as an important rural income generating subsidiary occupation augmenting the income of the agrarian community in the State. Sericulture is a fast-emerging important rural cottage industry in the state. A good proportion of people are engaged in sericulture farming providing employment to rural population in the state. The State Government has established a Separate Sericulture Wing in 1951, under the control of Director of Industries which is working for the sericulture development in the State.

The present study is an attempt to undertake an in-depth analysis of sericulture farmers in respect of changes in silk production, employment generated, income enhancement and improvement in standard of living have been brought about by this subsidiary occupation with the passage of time. An objective as well as subjective approaches have been followed in collection of data through telephonic interviews.

The findings of the report highlight the constraints faced by sericulturists which in rising production and productivity of silk increasing and the income of sericulturists engaged in sericulture farming. Further, the measures required to be taken to overcome the problems/constraints faced by the sericulturists have been suggested at the end of the report. The recommendations have been made on the basis of the actual findings from the analysis of the observed and collected information.

The study will help the policy makers, particularly the Department of Industries Sericulture, Wing of HP, other Government departments, academicians, NGOs and State/ central agencies alike.

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Glossary of terms

APL	Above Poverty Line
BC	Before Christ
BPL	Below Poverty Line
CDP	Catalytic Development Programme
CRC	Chawki rearing Centre
CSB	Central Silk Board
DGCIS	Directorate General of Commercial Intelligence and Statistics
GSFs	Government sericulture farms
H H	Household
MT	Metric Tonnes
NA	Not Available
NGOs	Non- Government Organisations
OBCs	Other Backward Classes
RKVY	Rastriya Krishi Vikas Yojana
SC	Schedule Caste
SDOs	Sericulture division Officers
SHG	Self Helf groups
ST	Schedule Tribe

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CHAPTER-I

GLOBAL SILK PRODUCTION AND SHARE OF INDIA

1.1. Background:

Sericulture, or silk farming, is cultivation or rearing of silkworms to produce silk. Sericulture was derived from the word Su and Si which means silk in Chinese. In sericulture Seri means silk and culture means rearing[1].Therefore, sericulture is an art of rearing silkworm for the production of silk and other by-products.

Silk was believed to have first been produced in China as early as in the Neolithic period. According to the historians, sericulture originated in China in around 2,640 BC. Chinese kept the secret of sericulture for several hundred years. Some historians believe that Korea was the first country after China to learn sericulture farming as the Chinese immigrants introduced sericulture in the land of Korea in about 1,200 BC. The sericulture along with silk industry was an avocation in India during the second century B.C. According to historians, raw silk was exported during the reign of Kanishka in 58 B.C. Some legend says that the Chinese Buddhist monks smuggled eggs of silkworms and the seed of mulberry tree in their hollow bamboo sticks[2].

In its long history, silk industry passed through the periods of great prosperity as well as downfall. Prior to 19th century, sericulture was mostly

[1]Parmar, Monika," Analysis of Sericulture in Himachal Pradesh; A case study of Kangra District in HP (India)", the International Journal of Humanities & Social Studies, P.1.
[2]WIKIPEDIA, "sericulture" P.2. (https://www.wikipedia.org/wiki/sericulture) last visited on dated 15th march, 2021.

confined to northern and eastern India. It was only during the twentieth century, that itfurther spreaded to the Southern Peninsula, which is now a major sericulture zone in India.

1.2. Global Silk Industry:

The major silk producing countries in the world are, China, India, Uzbekistan, Brazil, Japan, Republic of Korea, Thailand, Vietnam, DPR Korea, Iran etc. Few other countries are also engaged in the production of cocoons and raw silk in small quantities.These are Botswana, Kenya, Nigeria, Zambia, Zimbabwe, Bangladesh, Colombia, Egypt, Japan, Nepal, Bulgaria, Turkey, Uganda, Malaysia, Romania, and Bolivia etc. The major silk consumers of the world are USA, Italy, Japan, India, France, China, United Kingdom, Switzerland, Germany, UAE, Korea, andVietnam.

Even though silk occupies small percentage of the global textile market (less than 0.2%),the precise global value is difficult to assess, as reliable data on finished silk products is lacking in most importing countries. The production base of Silk is spread over about 60 countries in the world while major producing countries are in Asia, contributing to about 90% of mulberry production and almost 100% of non- mulberry silk. Sericulture is alabour-intensive industry. Sericulture provides employment to about 1 million workers in China while about 8.61 million people in India are engaged in sericulture activities and getting the employment from it. About 20,000 weaving families in Thailand are getting employment from this industry[3].

China is the world's single largest producer and chief supplier of silk to the world markets while India ranks second.

1.3. Global Silk Production:

Looking at production data of world's 22 major silk producing countries, it can be inferred that total production of silk is declining rapidly as these countries were producing 2.02 lakh MT of silk in year 2015 while

[3]International Sericulture Commission, “Statistics”, 2020, P.1-2. www.inserco.orgvisited on dated 15th march, 2021.

production continuously fell and decreased to 1.92 lakh MT; 1.78 lakh MT; 1.59 lakh MT; and 1.09 MT during the years 2016; 2017; 2018 and 2019 respectively. Even, the world's largest producer, China also registered tremendous fall in its silk production at a CGR of -16.6%. But, on other hand India's silk production recorded CGR of 4.66%.In absolute terms, production of silk in India increased from 28,523 MT in the year 2015 to 35,820 MT in 2019. Table 1.1 exhibits detailed variations in silk production for major silk producing counties of the world.

Table: 1.1. Global silk production (MT)

Sr. No.	Countries	Years					CGR
		2015	2016	2017	2018	2019	
1	Bangladesh	44.00	44.00	41.00	41.00	41.00	-1.40
2	Brazil	600.00	650.00	600.00	650.00	469.00	-4.81
3	Bulgaria	8.00	9.00	10.00	10.00	10.00	4.56
4	China	1,70,000.00	1,58,400.00	1,42,000.00	1,20,000.00	68,600.00	-16.60
5	Colombia	0.50	-	-	-	0.50	0
6	Egypt	0.83	1.20	1.10	1.25	1.50	12.56
7	India	28,523.00	30,348.00	31,906.00	35,261.00	35,820.00	4.66
8	Indonesia	8.00	4.00	2.50	2.50	2.50	-20.76
9	Iran	120.00	125.00	120.00	110.00	227.00	13.60
10	Japan	30.00	32.00	20.00	20.00	16.00	-11.81
11	Madagascar	5.00	6.00	7.00	7.00	7.50	8.44
12	North Korea	350.00	365.00	365.00	350.00	370.00	1.12
13	Romania	-	-	-	-	0.50	0
14	Philippines	1.20	1.82	1.50	2.00	2.00	10.75
15	South Korea	1.00	1.00	1.00	1.00	1.00	0
16	Syria	0.30	0.25	0.25	0.25	0.50	10.76
17	Thailand	698.00	712.00	680.00	680.00	700.00	0.06
17	Tunisia	3.00	2.00	2.00	2.00	2.00	-7.79
19	Turkey	30.00	32.00	30.00	30.00	5.00	-30.12
20	Uganda	-	-	-	-	3.10	0
21	Uzbekistan	1,200.00	1256.00	1200.00	1800.00	2037.00	11.16

Source: International Sericulture Commission

1.4. Silk Production in India:

Silk use has been an integral part of life and culture of the Indians. India has a rich and complex history in silk production and its trade dates back to 15th century[4]. Sericulture provided employment to approximately 9.52 million persons in rural and semi- urban areas in India during 2019-20[5]. A sizeable number, of people engaged in sericulture activities and who are earning their livelihood from it belongs to economically weaker sections and also includes women and small land holding farmers.

India has the unique distinction of being the only country producing all five known commercial varieties of silk, namely mulberry, tropical tasar, oak tasar, eri, and muga, of which, muga with its golden yellow glitter is unique and prerogative of India. Mulberry sericulture is mainly practiced in five States namely, Karnataka, Andhra Pradesh, Assam, West Bengal, and Tamil Nadu. These states are major silk producing States in India. The north east States of India enjoy unique distinction as it is the only region in India that produces all the five verities of silk viz: Mulberry, Oak, Tasar, Muga and Eri. Overall, this region contributes about 18% of India's silk production[6]. Among the four major varieties of silk produced in 2019-20, Mulberry accounted for 70.21% (25384 MT), Tasar 9.3% (3,370MT), Eri 19.80% (7,157 MT) and Muga 0.66% (240 MT) of the total raw silk production in India (36,152 MT).

The year-wise production figures of silk are given in table 1.2. Table reveals that during 2019-20 total raw silk production in the country was recorded 36,152 MT registering an increase of 1.9% over total production of silk in previous year. The mulberry silk production was marginally up by 0.2% during 2019-20 over the previous year. Vanya silk which includes Tasar, Eri, and Muga silks has registered a CGR of 6.0% during 2015-16 to 2019-20.

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[4]Vkaspedia, "Sericulture in India, p.1. (www.vikaspedia.in/sericulture/sericulture-in-india) last visited on 15th march, 2021.
[5]International Sericulture Commission, www.inserco.org visited on dated 15th march, 2021.
[6] Vikaspedia, "Sericulture in India". Ibid, P.1.(www.vikaspedia.in/sericulture/sericulture-in-india) last visited on 15th march, 2021.

1.4.1. Year- wise silk production:

Table 1.2 presents raw silk and vanya silk production in India and its growth from the year, 2015-16 to 2019-20. It is revealed from the table that raw silk production in India has registered CGR of 4.40 percent while CGR of vanya varieties of silk production showed higher growth during same period. It can be inferred that demand for and production of vanya variety of silk is growing at a faster pace in India.

Table: 1.2. Year- wise silk production scenario of India.

(In MT)

Sr. No.	Particulars	Years					CGR
		2015-16	2016-17	2017-18	2018-19	2019-20	
1	**Raw Silk Production**						
1.1	**Mulberry (Bivoltine)**	4613	5266	5874	6987	6993	7.73
1.2	**Mulberry (Cross breed)**	15865	16007	16192	18358	18391	2.99
Sub Total Mulberry		20468	21273	22066	25345	25384	4.40
2	**Vanya**						
2.1	Tasar	2819	3268	2298	2981	3370	3.64
2.2	Eri	5060	5637	6661	6910	7157	7.18
2.3	Munga	166	170	192	223	240	7.65
Sub Total Vanya		8045	9075	9840	10124	10768	6.00
Grand Total		28523	30348	31906	35468	36152	4.85

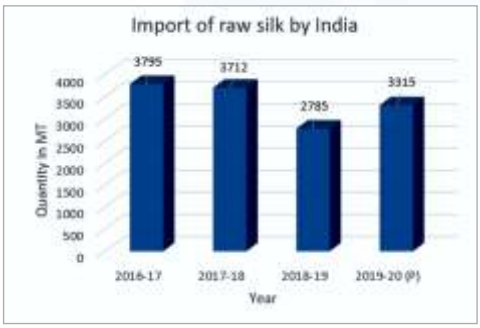
Source: Central Silk Board India.

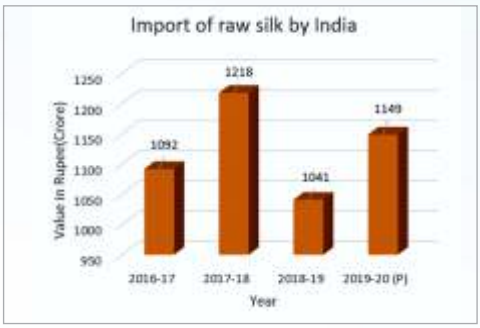
1.6. Import of raw silk by India:

India imports raw silk from various countries of the world to meet growing domestic demand for silk fabrics and sarees as well as for meeting export requirement of silk readymade garments and silk carpets etc. The silk import for the period between 2016-17 to 2019-20, registered a decline recording a negative CGR 3.32 percent which is good sign from the view point side of country's silk Industry's future prospect only if the gap in demand was actually met by the domestic production.

The trends in raw silk import of India during the said period in terms of value and quantity are depicted in Graph 1.1. It is clear that import of raw silk declined in three consecutive years but in 4th year (2019-20) it again started increasing. In terms of value the import of silk, it shows increasing trend which indicates that prices of raw silk in international market were increasing during the period under consideration.

Graph1.1: Import of Raw Silk by India:





Source: Central Silk Board India

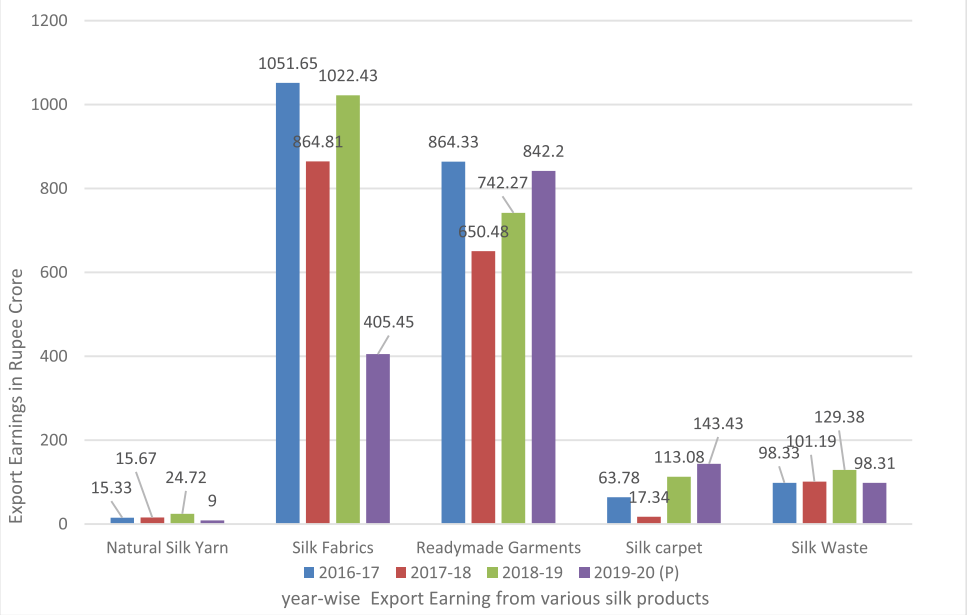
1.7. Export Earning in India from silk and silk products:

India's silk products are known for its finery and artistic designs and distinct colours. The country is known, the world over, for its exquisite brocade fabrics of Banaras, silk of Karnataka, Tie--and-Dye- and Patolaof Gujarat and Rajasthan, ikats from Orissa, fine Bandhej and temple silk of Kancheepuram and Tanjore etc. These are only a few of the myriad range of silk weaves, textures and patterns available in India. Aggressive promotion of the silk industry in India has attracted a large number of organized players to set up large silk industries here. During the year 2019-20, India exported silk goods worth of Rs. 1,498.39 crore to various destinations in world. India usually exports silk fabrics, readymade garment, and silk carpet etc. The diagram 1.2 shows that the maximum export earnings of India from among the silk items are from selling of silk fabrics followed by readymade garments. India export maximum silk fabrics but this also declined considerably in 2019-20. The export of silk based readymade garments has remained largely steady between 2016-17

and 2019-20.

The silk carpet exports have registered CGR of 22.46 percent, while the export earnings from silk carpet were recorded as Rs. 143.43 crore in the financial year 2019-20. This indicates to rising exporting demand of Indian silk carpets in the international market. As can be seen, natural silk yarn constitutes a very small proportion of the total silk exports from India.

Graph 1.2 EXPORT EARNING OF INDIA FROM SILK PRODUCTS



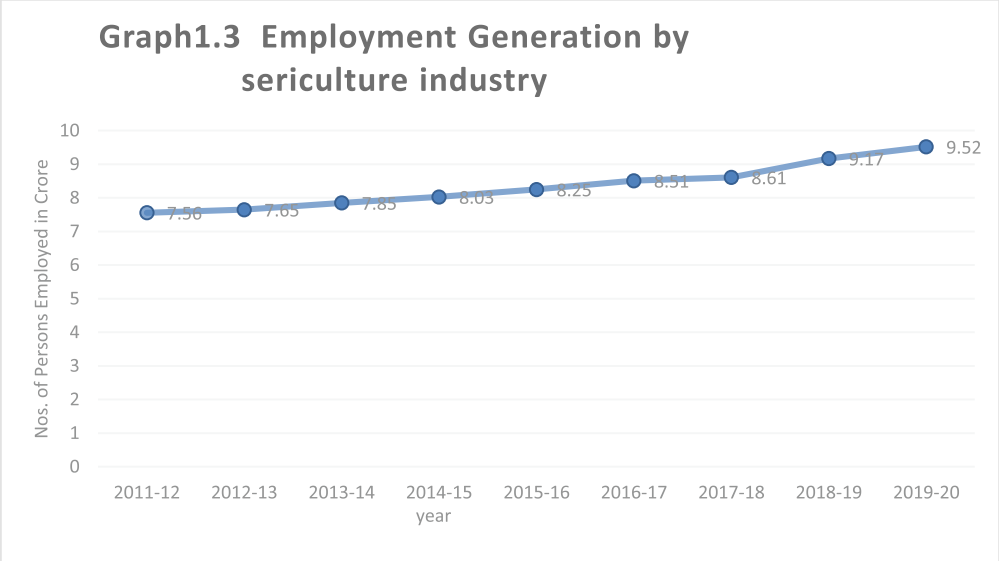
Source: Statistics compiled from DGCIS, Kolkata. *P: Provisional*

1.8. Employment Generation from sericulture farming in India:

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 in durability. Because of these unique features, silk is known as the "Queen of textiles" the world over. On the other hand, it stands for livelihood opportunity for millions, owing to its high employment potential, low capital requirement and remunerative nature of its production. The very nature of this industry with its rural based –

"on- farm" and "off- farm" activities and enormous employment generation potential has attracted the attention of the planners and policy makersto recognize the industry as one of the most appropriate avenues for socio-economic development of a largely agrarian economy of India. Employment from sericulture industry is increasing every year.

The employment in silk industry grew at a compound growth rate of 2.59% in India during the period between 2011-12 to 2019-20, while total employment provided by this industry in 2019-20 was 9.52 (P) million persons. These employed persons are from rural and semi-urban areas of India. The year 2019-20 recorded an increase of 3.82% in the number of persons employed over the last year,whereas the highest growth in the number of persons employed in a year over the previous year was in 2018-19 (6.5).



Source: Central silk Board of India.

1.9. Strategy for production of raw silk in India:

The demand of raw silk and the silk products including readymade garments has increased within country and outside over the decades. The Indian government has started a large numbers of schemes and programmes through Central Silk Board to enhance silk production in

India to meet the demand. In this regard, Central Silk Board has fixed the target to increase the national silk production for the next few years. The production is targeted to increase by a little more than 4% per annum over the next 3 years. The targets fixed by CSB for the period between year 2021-22 and 2023-24, are given in table no. 1.6.

Table: 1.6. Silk Production Target from 2021 to 2023.

S.No.	year	Target (MT)	% increase from previous year
1.	2021 -22	45 ,000	-
2.	2022 -23	46 ,850	4.11
3.	2023 -24	48 ,800	4.16

Source: Central Silk Board of India

1.10. Role of Central Silk Board of Indi to enhance seed production:

The CSB has a chain of basic silkworm seed farms supplying basic seeds to the States. Its commercial seed production centers augment efforts of the States in supplying commercial silkworm seed to farmers. Mulberry silkworm seed is the largest demanded seed in India as is clear from the table. The production of silkworm's seed exceeded well above the target during 2018-19.

Table: 1.7. Quantity of Seed Production

(in Lakh Dfls.)

S.No.	Variety of Silkworm seed	2017-18		2018-19		2019-20	
		Target	Achmnt.	Target	Achmnt.	Target	Achmnt.
1.	Mulberry	440.00	388.35	440.00	483.04	470.00	399.87
2.	Tasar	50.11	52.34	51.02	51.08	51.17	55.53
3.	Oak Tasar	0.99	0.47	0.64	0.78	1.48	0.44
4.	Munga	8.07	7.08	8.16	5.33	5.65	5.71
5.	Eri	6.00	6.88	6.00	7.22	6.30	6.64
Total		**505.17**	**455.12**	**505.82**	**547.45**	**534.60**	**468.19**

Source: Central Silk Board of India

1.10. State-wise raw silk production in India:

Silk is produced almost in all the States of India, but Karnataka, Andhra Pradesh, Tamil Nadu West Bengal, Jharkhand, Assam and Meghalaya are the major silk producing States contributing about more than 90% share in total silk production of India. Telangana, Maharastra, Chattisgarah, and Arunachal Pradesh though do not contribute much to the overall silk production, yet they have recorded impressive growth in silk production. However, the actual growth in silk production has marginally fallen short of the targets during the period between 2016-17 and 2019-20. An interesting inference that can be down from the table 1.8 is that all the major silk producing States except Assam have started showing the signs of stagnation in silk production as is indicated by the growth rate registered by these States. The state-wise production figures from the year 2016-17 to 2019-20 is given in table 1.8.

Table: 1.8. Year-wise silk production in various States of India (In MT)

S.No.	State	2016-17		2017-18		2018-19		2019-20		CGR	
		Target	Achmnt.	Target	Achmnt.	Target	Achmnt.	Target	Achmnt.	Target	Achmnt
1	Karnataka	11000	9571	11120	9322	10750	11592	12000	11143	2.2	3.87
2	Andra Pradesh	5505	5970	6090	6778	7805	7481	7946	7962	9.6	7.46
3	Telangana	150	119	160	163	200	224	295	297	18.42	25.69
4	Tamil Nadu	2000	1914	2000	1984	2190	2072	2300	2154	3.55	2.99
5	Kerla	10	11	12	15	14	16	20	16	18.92	9.82
6	Maharashtra	285	259	328	373	415	519	630	428	21.93	13.37
7	Uttar Pradesh	280	269	300	292	340	289	365	309	6.85	3.52
8	Madhya Pradesh*	275	111	230	103	160	100	165	54	-11.98	-16.48
9	Chhattisgarh	290	361	405	532	670	349	562	480	17.98	7.38
10	West Bengal	2706	2565	2590	2577	2775	2394	2900	2464	1.74	-0.99
11	Bihar**	84	77	85	63	95	55	86	3	0.58	-55.57
12	Jharkhand	2622	2631	2744	2220	2658	2375	2604	2697	-0.17	0.62
13	Odisha*	130	125	140	116	148	131	155	118	4.49	-1.43
14	Jammu & Kashmir	170	145	180	132	190	118	170	117	0	-5.22
15	Himachal Pradesh	40	32	40	32	43	34	50	30	5.73	-1.6
16	Uttarakhand	35	34	44	35	45	36	42	41	4.66	4.79
17	Haryana	1	1	2	0.7	2	0.7	2	1	18.92	0
18	Punjab	1	3	6	3	5	3	5	3	49.53	0
19	Assam & Bodoland	4103	3811	4705	4861	4980	5026	5395	5316	7.08	8.67
20	Arunachal Pradesh*	48	45	58	54	65	59	75	60	11.8	7.45
21	Manipur	530	529	560	388	435	464	600	470	3.14	-2.91
22	Meghalaya	900	927	1070	1076	1110	1187	1220	1192	7.9	6.48

Source: Central Silk Boardof India Note refer to data of April to Feb. 2020** refer to April to Sep. 2019 (P) Provisional*

Conclusion:

Total silk production by major silk producing nations has been reduced to half between the period from 2015 to 2019 whereas, China, the largest producers of silk in world has witnessed a reduction in its silk production by about 60% during the same period. Defying global trends India has registered a gradual increase in silk production during this period. This indicates to the resilience that the Indian silk industry has exhibited during the period of global slowdown. The high labour intensity of the occupation is supported by the fact that the employment generation has also increased with the increase in silk production during these years. Incidentally, India has also an advantage of having conducive climatic conditions for production of all the five varieties of silk. This can be taken as an opportunity by the Central Government, of cause in engagement with the State Governments, to explore the existing potential in the area and provide employment to the rural farmers and entrepreneurs. The robustness of sericulture in India, which has successfully resisted downward pulls, generated by the global trends in silk production needs to be strengthened further by supporting the State Governments keeping in the spirit of cooperative federalism.

The comparative advantage, with India, lies in exporting silk fabrics and garments made of silk as is evident from the time series data. These two activities alongwith global demand for silk carpets indicate to strong backward and forward linkages associated with sericulture. The value addition to raw silk makes these activities more attractive as these have potential of fetching good prices in the international market. These linkages also suggest existence of employment potential associated with this occupation.

The States which have shown stagnation in the growth rate or have registered a negative growth rate in silk production need diagnosis of the factors responsible and a quick intervention to address the issues identified. Whereas, the States that have registered two-digit growth rate in silk production, need encouragement and hand holding by a specialized agency of the Central Government, if required, to see that these States near full realization of potential existing in these States. Interventions at

different levels are also required to see that the finished products find appropriate markets fetching right prices.

CHAPTER-2

RESEARCH DESIGN & METHODOLOGY

2.1. Importance of appropriate research methodology:

Research & Development is an important tool for acquiring new knowledge in any field. Research gives us the direction for optimum utilization of resources by overcoming the various constrains existing in the study area. For a scientific and systematic study, an appropriate methodology is essential component of sound research investigation. A sound methodology gives the direction to make the research study manageable, smooth, and effective. Formulation of hypothesis, research design and techniques for measurement of variables are important parts of a perception and intellect of researcher yet major objectives of the study and socio- economic or geographical factors are also important for determining appropriate mix of qualitative and quantitative methods. The present chapter, therefore, elaborates the details of research methodology in terms of design, method of data collection, analysis of data, measurement of selected variables and limitations of study.

2.2. Plan of the Study:

The study was conducted in four phases. Under first phase of the study, introductory part of sericulture farming,i.e., production, import &export, and employment generation scenario of sericulture at international, national and state level were taken into consideration. In this phase, an attempt has also been made to study physical, demographical, socio-economic and geographic characteristics of the study area. In addition, a

detailed review of relevant available literature on different aspects of sericulture was also undertaken.

The second phase of the study was in respect of the vision, mission and objectives of the study. Methodology based on literature review and analysis of secondary data obtained in the first phase was finalized keeping in view the objectives of the study. This included developing a suitable framework for data collection and analysis as well as formalizing the research design.

The third phase of the study includes collection, editing, coding, tabulating and organizing data collected from secondary and primary sources as per the objectives of the study.

The fourth phase of the study comprised of data analysis, interpretation of findings and report writing and recommending suitable policy measures for future plan.

2.3. The methodology followed:

2.3.1. Vision of the study:

To conduct technical and economic study to assess the impacts in the form of enhancement in income and generation of additional employment opportunities in sericulture as a result of Government interventions.

2.3.2. Mission of the study:

To suggest policy measures to transform sericulture farming of state so that income of the people engaged in sericulture farming enhances resulting from additional employment opportunities in the sector.

2.3.3. Objectives of study:

- To study the impact of sericulture on livelihood of beneficiaries.
- To analyze the impact of sericulture in terms of raising income and providing employment to the beneficiaries.
- To ascertain the extent to which the target groups/ especially rural women and marginal farmers have actually been benefitted under

the scheme.

- To assess the awareness of the sericulturists with regard to new technology.
- To find out constrains and challenges, faced by sericulturists which adversely affect sericulture production in the state.
- To suggest policy measures to make the scheme more effective and beneficial.

2.3.4. Reference period of study:

The study was conducted during 2019-20 and attempt was made to analyze data pertaining to three years prior to period of study.

2.3.5. Major Research Question/Scope of study:

The Study attempts to probe the following research questions: -

- How Department of industries (Sericulture Division) implemented various silk development schemes in the state to enhance sericulture production in the State?
- Whether income from sericulture farmers has increased over the period?
- How much labour force (part time/ full time) is engaged in sericulture activities to get an idea about the employment provided by sericulture sector?
- How socio- economic condition of weaker section of society especially, rural women was changed through sericulture farming.
- What are the major problems faced by sericulturists, without the redressal of which the sericulture production is not possible to rise in the State?
- What are the suggestions/ policy measures to overcome the problems of sericulturists?

2.3.6. Limitations of study:

The study was conducted during a period when world was facing spread of COVID-19, epidemic. Data collection by actually visiting field was not possible and hence, data was collected through telephonic interviews with voice recording with prior permission of sericulturists interviewed.

The study was conducted with by interviewing (telephonic) a sample of 120 Seri-culturists from four selected Districts of Himachal Pradesh. One sericulture sub-division from each shortlisted District was selected for data collection. It required a larger sample of sericulturists interviewed however, it was not possible due to the existence of conditions prevailing because of COVID-19 and in view of difficulties in getting operational telephone numbers of the sericulturists. As the sample size was small, hence, to ensure equal representation of each sericulture sub-division, the datawas collected uniformly from 30, Sericulturists/households from each of the four sub- divisions.

The data were collected on the basis of oral enquiry for the initial period when the sericulture farming was started by respondent and for the period of the year 2019-20. Therefore, the accuracy of data depended entirely on the memory of respondents.

Due to the conditions prevailing during the reference period due to COVID -19 it was extremely difficult to verify all facts related to collected information as it was not possible to visit the field for verification of the same. Therefore, the help of the Sericulture Officers at Divisional level was taken to seek clarifications wherever it was required. Thus, while due care was taken to extract accurate information, the possibility of a few erasures from the memory of the respondents can not be ruled out.

2.3.7. The Methodology for data collection:

The Research design and methodology for undertaking the survey was based on the objectives and the scope of the study. The data was collected from both primary and secondary sources.

2.3.7. (A) Primary Sources:

The primary data was collected from the person of households primarily involved in mulberry raising and silkwormrearing through telephonic interviews as field visit for the data collection was not possible. The details of the sericulturists (Mobile Nos. and Addresses etc.) were provided by Sericulture Extension Officer at the Sericulture Divisional level.

The data were collected from the beneficiaries on structured and pre-tested schedule of questions. The Questionnaire included both qualitative as well as quantitativequestions so that both kinds of data could be obtained for better outcome. The data on the following aspects were collected during the months of November and December, 2020, for the year, 2019-20:

- General information
- Sericulture farming experience of beneficiaries.
- Ownership of land and land use for sericulture farming
- The details of the assistance received by beneficiaries through various Government schemes for construction of separate rearing house.
- Details of the mulberry trees planted/ survived.
- Assistance given to beneficiaries by implementing department in the form of mulberry saplings, silkworm seed and rearing equipment etc.
- Use of silkworm seed and cocoons production.
- Marketing of cocoons both by private and government agencies.
- Questions, the answers to which would indicate to annual income of beneficiaries from all kinds of agricultural activities and from sericulture farming separately.
- Employment generation form all kinds of agricultural activities and from sericulture farming separately.

- Expenditure patter of additional income generating through sericulture farming.
- Women empowerment because of sericulture farming.
- Problems of sericulturists.

2.3.7.1. Sampling Procedure:

The study was carried out in Sericulture Divisions i.e.,Dehra, Ghumarwin, Mandi and Nadaun established in four Districts of Himachal Pradesh viz: Kangra, Bilaspur, Mandi and Hamirpur, respectively. The multi-stage random sampling method was used to approach selected Sericulture Division. In first stage the District was selected on the basis of the sericulture production in respective Districts while in second stage sericulture division was selected on the basis of the area. The random technique for selection of sample was applied on data/ list of beneficiaries (including mobile no. and address etc.) provided by various officers of the Sericulture Divisions, of Industries Department of Himachal Pradesh.

The details (including mobile no. for telephonic interview) of sericulture beneficiaries were received from each Division mentioned above and a sample of 120 respondents was selected out of these beneficiaries. The sample of 30 beneficiaries through random sampling method was taken from each sericulture Division.

2.3.7. (B) Secondary Sources:

Secondary data of sericulture production, cocoon price, area under sericulture silkworm seed and availability of sericulture infrastructure in State was obtained from Sericulture Wing of Directorate of Industries, Himachal Pradesh. While secondary data of country and international sericulture production were taken from Silk Board of India, international sericulture commission, Ministry of Economics and Statistics, Government of India and other published reports of government of India. The information from various journals/ articles and research studies was used for review of literature.

2.3.8. Research Tools/ Data Analysis:

The data collected from primary and secondary sources was carefully scrutinized and transcribed before the commencement of data tabulation and interpreted using statistical tools. The Compound Growth Rate (CGR) was calculated in case of secondary data available over the period of time. The relationship among various variables was analyzed by using cross tabulation, average, percentage, and trend analysis. For descriptive analysis of the data MS excel graphs have been used to exhibit the trends in the movement of two or more variables.

2.3.9. Reporting:

The study was systematically planned and is presented in multiple chapters. The output of the evaluation study is based on the findings from data. The output of the study is helpful in revealing the impact of improved farm technologies on production and productivity of sericulture in the state. Central/State Government's initiatives for the betterment of sericulture farming were taken into account. The policy measures have also been suggested for improvement of sericulture farming in the state. As study is based on empirical evidences, it will definitely help the policy makers to think of formulating strategies to give desired pace to development of sericulture industry in the State. The report also contains summary and conclusion. The survey schedule is appended at the end of the report.

CHAPTER-3

REVIEW OF LITERATURE

The purpose of the review of literature was to identify the gaps and conflicts in previously done studies, to shortlist learnings and best practices if any, which may change the silk production scenario of State, if replicated; and finally, to identify the need for further research through which a best possible plan/strategy could be formulated for improvement of Silk industry in State. The Review of literature was done on various components viz: Production, income and employment generation, role of modern technology in production of silk and contribution of women labour force etc.

3.1. Sericulture/Silk farming Production:

Sericulture or silk farming is the cultivation of silkworms to produce silk. Although, there are several commercial species of silkworm, but Bombyx Mori (the caterpillar of the domestic silk mouth) is the most widely used silkworm. China and India are the main producers of silk, producing about 60% of world's annual silk production[7].

Silk occupies a small percentage of global textiles market, even less than 0.2% of total world export. The production bases of sericulture are spread

[7]Wikipedia "Sericulture",P.1.

over 60 countries in the world while the major producers are in Asia (90% of mulberry production and almost 100% of non-mulberry production)[8].

The demand for superior quality bivoltine silk is increasing in India for domestic consumption and so is for value added silk products for the export market. The Ministry of Textiles, Government of India and Department of Sericulture in various States provide technical and financial assistance for enhancing the bivoltine silk production[9].

Sao, S and Ali, E (2009), find out that Sericulture had been a traditional livelihood activity for rural families of Malda district, which contribute to 75% of total silk production of West Bengal State and 6% of country. There are 60,318 farmers engaged in sericulture using 20,789.28 acres of private land in the district[10].

3.2. Income and Employment Generation:

Hanumappa and Erappa, in their study, incorporate as to how the sericulture farming is beneficial for the farmer occupying marginal, and small land holdings. They explain that about 90% of the farmers in India are marginal and small land holders with fragmented agriculture holdings. They require assurance of self-employment for family labour in the light of existence of severe unemployment problems in rural area. Hence, mulberry sericulture is one of the incomes assuring occupation to rural people. It needs low capital and ensures year-round employment opportunities[11].

Manjunatha, N, Wilson, W. Kispotta and J. Ashoka, in their study "An economic analysis of Silkworn cocoon production: A case study in Kolar district of Karnataka", (2017) attempt to investigate the economic profile of the farmers engaged in sericulture and also its costs and returns. The study focuses on socio- economic background and operational problem of

[8] International sericulture Commission.
[9] Central Silk Board of India.
[10] Sao, S. and Ali, E. (2009) "Socio- economic disparities and the role of local development strategies for the development of sericulture for rural development: case study of Malda District of West Bengal, India," Ed. Jerzy Banski, Vol. 20.
[11] Hanumappa,HG and Erappa,s.,1985, "Economic issue in sericulture", Study of Karnataka, Economic and Political Weekly, 20: 3122-3224.

sericulturists selected for the study. The study analyzed the involvement of male, female and children in study area which are reported as 46.41, 33.41 and 20.45 percent, respectively.This indicates that sericulture farming is providing employment opportunities to all section of society[12].

Rakesh Sharma (1980) in his study "Economics of sericulture industry in Himachal Pradesh Silk observes that mulberry leaf can be obtained from both trees grown along side road and trees grown on field edges. He further analyzed that cost of per Kilogram leaf and silkworm rearing cost of one ounce of silk eggs, on an average was Rs. 30 and Rs. 322, respectively. The average per household net return from sericulture farming for both the seasons is about 596 per annum[13].

Bhatikar (1985) estimates that one acre of irrigated mulberry cultivation provides employment opportunities to more than three persons throughout the year. They found out that about Rs. 5300 per annum per acre, can be earned through sericulture.This was greater than one acre returns from the sugarcane farming which was about to Rs. 3000. It shows sericulture farming gives more returns to the farmers ascompared to other crops[14].

3.3.Women Participation in silk farming:

N.A. Ganie, K.A Dar, I.L Khan, R.K. Sharma and K.A. Sahaf (2018) in their study "Sericulture- A Viable Option for Sustainable Livelihood and Employment Generation for Rural Population of J&K" state that sericulture emerged as one of the most important cash crops with minimum investment, low gestation period, high employment potential and highly remunerative returns. They further explain that sericulture has provided employment and income generation in rural and semi urban areas. It has also provided an opportunity for high participation for low

12. Manjunatha. N, Wilson, W. Kispotta and j. Ashoka" An economic analysis of Silkworm cocoon production: A case study in kolar District of Karnataka, Agri Sci. Digest., 37(2) 2017:141-144.
13. Rakesh Sharma, (1980), "Economics of sericulture industry in Himachal Pradesh, Indian silk 19 (5); 25-32.
14. Bhatikar, AP, 1985, "Sericulture and rural Industriazation (Part I), Indian Silk, 24 (2):7-16.

income and socially underprivileged groups[15].

Patil, B.R.et al. (2009), point out that sericulture industry is a labour-intensive industry and has a very good potential to provide employment to the rural masses at local level. It is an eco- friendly activity which provides an opportunity to rural labour to uplift their socio-economic status. They further illustrate that sericulture is an ideal programme for weaker sections of the society because of low gestation, period and higher return[16].

Roy Pankaj and Rintusarkar (2015), in their study "Work Participation and Income Generation form sericulture: A case study of Alamtola village of Kaliachak-II Block in Malda District West Bengal", investigate the rate of work participation among men and women in different age groups and the earnings form sericulture as a livelihood in the Alamtola village of Malda District. They find out that female participation was more than the male counterparts in each age group. In case of income generation from sericulture production, most of the households earned Rs. 5000 to Rs. 15000 per annum[17].

Chandrama Goswami, and Manisha Bhattacharya (2013) assess the income generating activities and women participation in sericulture in the Goalpara District, of Assam. They illustrate that sericulture, being a cottage industry, provides ample work for the women in rural areas, while their male counterparts look after agriculture.Most of the operations of sericulture farming do not require hard labour and also, silk worm being delicate,is required to be handled with care. Thus, the entire process needs skill and patience, which suits women well[18].

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15. N.A. Ganie, K.A Dar, I.L Khan, R.K. Sharma and K.A. Sahaf (2018), "Sericulture- A viable option for sustainable livelihood and employment generation for rural population of J&K", Global Journal of Bio-Science and Biotechnology, Vol.7 (1): 200-203.

16. Patil, B.R. Singh, KK, Pawar, SE, Maarse, l., and Otte,J2009, Sericulture an alternative source of income to enhance the livelihood of small-scale farmers and tribal communities, research report, BAIF Development Research foundation, pune,26.

17. Pankaj, Roy and Rintu Sarkar, (2015), "Work participation and income Generation from sericulture: a case study of Alomtola village of Kaliachak-II, Block in Malda District, West Bengal", Social and Economic Geography, 1.1: 31-36.

18. Chandrama Goswami, Manisha Bhattacharya (2013), "Contribution of sericulture to women's income in Assam-A case study in Goalpara District of Assam, India", International Journal of Scientific and Research publication, Vol. 3, ISSN 2250-3153.

Parimala (2009) in the study "Role of women in Sericulture" reveals that the role of women in sericulture is remarkable and it helps to eradicate the unemployment problem among the rural women[19].

Mehta and sethi (1977) analyzethat woman are mostly engaged in the unorganized sector. They are overwhelmingly concentrated in agro-based/ household activities such as dairying, fisheries, handlooms, handicraft and sericulture etc. In many countries including India, women are often paid two thirds or even half of the wages earned by men for the same task (FAO, 1995).

3.4. Adoption of New Technology/Knowledge of Sericulture:

It is revealed from the Research Article of Lakshmanan, S. and Geeta Devi (2007) that independent variables such as education, farming experience, extension participation, scientific orientation and risk orientation etc. are positively related with knowledge level of the respondents. They further elaborate that sericulture plays a key role in the up-liftment of rural population, both -socially and economically. In the past two decades, various technologies have been developed both in increasing mulberry yield and silkworm rearing and with the application of these technologies constraints in silk farming can be overcome.

Meenal, R. and Rajan, R.K (2007) in their study "Silkworm rearing technology" emphasize on the training of sericulturists with respect to improved methods of silkworm rearing. They further state that a proper support system and basic rearing infrastructure should be created among the target beneficiaries. The silkworm growers need to be demonstrated

[19] Parimala, A.G. (2009), "Role of women in sericulture", Kisan world, PP.33-34.
[20] Mehta, S. and Sethi, N. (1997), "Targeting women for developing social welfare", 43 (10): 14-16.
[21] Lakshmanan,S. and Geeta Devi, R.G. (2007), "Knowledge and adoption level of farmer of bivoltine and cross breed sericultural technologies", Indian Journal of sericulture, 46 (1): 72-75.

about the latest methods of silkworm rearing and consequently they will adopt the avocation of sericulture as an income augmenting and employment creating venture by selling their produce[22].

D. K. Hadimani, Moulasab, J Ashoka and Manjunath (2017), in their research paper analyze the knowledge level of improved sericulture production technologies of farmers in Bidar district of North Karnataka. The findings of the study reveal that more than half (54%) of the respondents possessed medium knowledge level while only 20% respondent possessed high knowledge level. Though extension network has been established at national and state levels to educate sericulturists, a wide gap, still exists between the recommended technology and actual adoption by sericulturists. To plan a suitable intervention strategy or to bridge the gap it is necessary to educate / train the sericulturists about new technology[23].

Sirajudeen (2011) in his research article "Sericulture Industry: An Overview", reveals that sericulture being a village-based industry is providing employment to a sizeable section of the population. Although sericulture is considered as a subsidiary occupation, technological innovation has made it possible to take it up on an intensive scale capable of generating adequate income[24].

[22] Meenal, R. and Rajan, R.K. (2007), "Impact of socio- economic characters of sericulturists on knowledge and adoption and cocoon production in Tamil Nadu", Indian journal of Sericulture, 46 (1): 49-51.
[23] Hadimani, D. K, Moulasab, J.Ashoka and Manjunath, (2017), "A impact study on sericulture production technologies by the farmers of Bidar district in Karnataka, india, International journal of current microbiology and Applied science, Volume-6:2368-2374
[24] Sirajudeen (2011) Sericulture Industry: An Overview., Tamil Nadu Journal of Cooperation, 62-65

CHAPTER-4

AN OVERVIEW OF SERICULTURE FARMING IN HIMACHAL PRADESH

Himachal Pradesh, situated in the heart of the western Himalaya, identified as "Dev Bhumi" has a total area of 55,673 square Kilometers and total population of 68.55 lacs (2011, Census), mostly, scattered over 9.59 lakh inhabited villages with population density of about 123 persons per square kilometer. The State has been endowed with varied agro- climatic and topographical conditions. Due to extreme variations in elevation, variations also occur in the climatic conditions of Himachal Pradesh. The climate varies from hot and sub-humid in the southern tracts to, cold, alpine, and glacial in the northern and eastern mountain ranges in higher altitudes[25]. The varied climatic conditions provide lot of opportunities for the realization of agro potential. The climatic condition in various Districts is favorable for mulberry growth and silkworm rearing. Sericulture activities are spread over in ten out of twelve Districts of State because of favourable climatic conditions.

4.1. Sericulture farming and development of sericulture infrastructure:

Sericulture in Himachal has a long historical background. Although, the state is not a comparatively larger producer of silk, yet it has been noted country wide for its quality silk[26]. Sericulture in the State is developing as an important rural income generating subsidiary occupation to augment the income of the agrarian community. Large numbers of people are engaged in sericulture in the state. The sericulture is fast emerging

[25] Economics and statistics, Department, Govt. of HP.
[26] Parmar, Monika," Analysis of Sericulture in Himachal Pradesh; A case study of Kangra District in Himachal Pradesh (India)", the International Journal of Humanities & Social Studies, P.1.

important rural cottage industry in the State. The State Government established a separate Sericulture Wing in 1951, under the control of Director of Industries.

4.2. Establishment of sericulture Divisions and Sericulture centers:

Presently, there are 8 Sericulture Divisions and 83 Sericulture Centers in the state. The Sericulture wing of Industries Department has the responsibility to supply silkworm seed to chowki rearing centers. The controlled climatic condition in chowki rearing centers ensures better survival of infant worms and then these silkworms are supplied to rearer for further processing. The highest numbers of Sericulture Centers i.e., 19 are established in Sericulture Division Mandi followed by sericulture Divisions Ghumarwin and Dehra where 13 and 11 Sericulture Centers have been established, respectively. The details of sericulture centers in Himachal Pradesh are given in table 4.1.

Table: 4.1: Organizational set up of Sericulture Centers in Himachal Pradesh

Sr. No.	Sericulture Divisions	No. of Sericulture Centre	Name of Sericulture Centers
1	Shimla	04	Palyad, Kunihar, Dutt Nagar and Nalagarh
2	Palampur	10	Lambagaon, Panchrukhi, Ichhi, Rajiana, Daulatpur, Nagrota Bhawwan, Palampur, Rajpur and Kangra
3	Dehra	11	Dehra, Nagrota Surian, Bankhandi, Bharoli, Badhwar, Bharmad, Muhal, Bangoli, Pirsaluhi and Nurpoor
4	Nadaun	10	Nadaun, Bohni, salasi, Jangalberi, Kangoo, Balbihal, Bhalwani, Takarla, Khadd and Hatli
5	Mandi	19	Mandi, Dadour, Dehar, Pandoh, Dadoh, Rajgarh, sanij, Narla, Balichowki, Nagwain, Mamel, Sainj, Bagachanogi, Dheemkataru, Saroa, Dharot, Murah and Manglore
6	Dhaulakuan	06	Dhaulakuan, Dorianbala, Purubala, Katasan Devi, KarondawaliGhati, and Parduni
7	Ghumarwin	13	Ghumarwin, Sanghaswin, Daslehra, Bhadolik alan, Ladda, Hatwar, Harlog, Pohni, Panjgain, Kothimajher, Kandrour, Auhar and Jakatkhana
8	Sandhole	10	Sandhole, Seoh, Gheera, sidhpur, Mohin, Sajaupiplu, Rakhota, Baldwara, Smaila and Chauntra

Source: Directorate of industries, Sericulture Wing, Himachal Pradesh.

The State Government has been making efforts to develop the required sericulture production and marketing infrastructure for the benefit of sericulturists in the state. There are two silkworm seed production centers, 05 silk technology demonstration-cum-training centers, two research extension centers, 19 silk reeling units and 24 silk handlooms etc. in the state. A snapshot of infrastructure created to promote sericulture farming in the state is given in table 4.2. A considerable presence of private sector in sericulture sector indicates to its importance in supplementing the efforts of the Government.

Table: 4.2. Infrastructure created under sericulture in HP.

Sr. No.	Particular	Numbers
A.	**State Sector**	
1	Mulberry farms	64
2	Silkworm seed production centers	02 (Palampur and Thunag)
3	Govt. sericulture Centre-cum-Chawki Rearing centers	83
4	Silk Reeling Demonstration-cum-Training centre	01 (Noorpur)
5	State Mulberry Production-cum-demonstration and training centers	01 (Nalagrah)
6	Silk Technology Demonstration-cum-training centers	05 (Ghumarwin, Dadour, Takarla, Dhaulakuan and Nadaun)
B.	Central Sector	
1	Research Extension Centers	02 (Ghumarwin and Palampur)
C.	**Private Sector**	
1	Silk Reeling Units	19
2	Silk Twisting Units	02 (Mandi and Ghumarwin)
3	Silk handlooms	24
D.	**Cocoon Marketing**	
1	Temporary Cocoon Markets	45
2	Cocoon Storage Centers	05

Source: Directorate of industries, Sericulture Wing, Himachal Pradesh.

4.3. Development of mulberry farms in various sericulture Divisions of State:

Silk production chain begins with the plantation of mulberry which once planted and if survives, yields mulberry leaves regularly for many years to come for rearing silkworms by procuring hygienically bred silkworms' seed.

There is total 64 mulberry farms occupying the area of 1,287.51 bighas where 2,19,860 mulberry trees are available for meeting the requirement of quality mulberry leaves for silkworm rearing in various rearing centers. The Division wise details of Government Mulberry farms are given in Table 4.3.

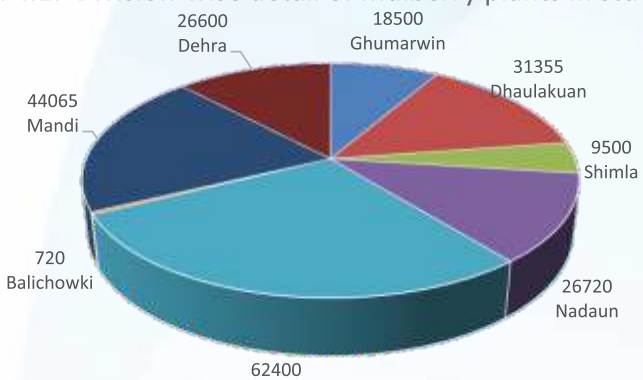
Sericulture Division Ghumarwin occupies largest area under mulberry farms which is 327.03 bighas covering of mulberry farms and comprises 25.04 percent of total area under Government mulberry farms in the State. Sericulture Division Palampur has 62,400 mulberry trees which is the largest number of surviving mulberry trees amongst all the Sericulture Divisions. Out of the total area under mulberry farms Palampur Division occupied 16.31 percent of the total area which accounts for the highest number of surviving mulberry plants followed by Sericulture Division Mandi, Dhaulakuan, Nadaun and Dehra in terms of surviving mulberry trees providing mulberry leaves.

Table No. 4.3: Division- wise detail of Government mulberry farms.

S. No.	Name of Division	Mulberry farms Area (in Bighas)	No. of Mulberry farm	No. of Mulberry trees
1	Ghumarwin	327.03 (25.40%)	09	18500
2	Dhaulakuan	144.08 (11.19%)	07	31355
3	Shimla	82.06 (6.37%)	02	9500
4	Nadaun	122.14 (9.49%)	10	26720
5	Palampur	210.05 (16.31%)	09	62400
6	Balichowki	04.00 (0.31%)	01	720
7	Mandi	316.15 (24.56%)	20	44065
8	Dehra	82.00 (6.37%)	06	26600
Total		**1287.51 (100%)**	**64**	**219860**

Source: Sericulture wing at Directorate of Industries, Himachal Pradesh.

Graph 4.1. Division-wise detail of mulberry plants in study area

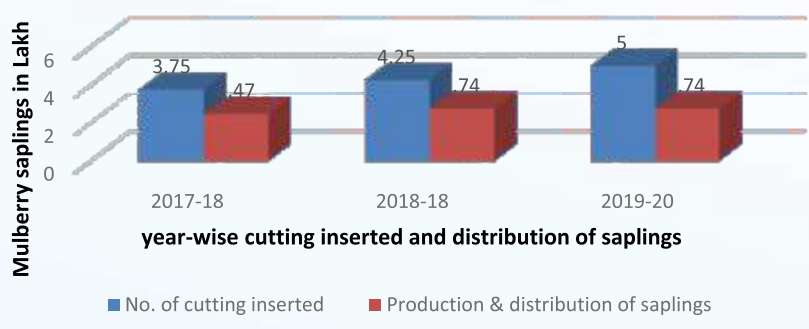


4.4. Production and distribution of mulberry saplings in the state:

The State Government established a State Mulberry Production-cum Demonstration and Training Centre at Nalagarh, District, Solan, in the year 2017, with the aim to produce the HYVs of mulberry saplings suitable for agro-climatic conditions of State and provide training to sericulturists interested in development of private mulberry nursery.

Presently, four varieties of mulberry are available, for cultivation in the State and these are S146, S1635, Tr-10, and Punjab local. Total number of mulberry cuttings inserted from government nurseries in the year 2019-20 were 5.00 lakh while the number of distributed saplings were only 2.74 Lakh during the same year.

Graph 4.2 Year-wise distribution of mulberry cutting and saplings by Govt. Nurseries in lacs



Source: Sericulture wing, directorate of Industries HP.

However, total number of saplings distributed has been much less than the total number of cuttings inserted, and this gap needs to be plugged by first assessing the reasons for this gap. Sericulturists have also started developing their own nurseries producing HYVs of mulberry saplings on commercial scale to meet growing demand of mulberry plants and have been fetching good price. Impressive growth in production of saplings by private nurseries indicates to growing demand for same in the State and also to the profitability in this activity.

Table.4.4: Year-wise production capacity and distribution of mulberry saplings by Private Nurseries.

Sr. No.	Particular	Year			
		2017-18	2018-18	2019-20	CGR
1	Nurseries established (in Numbers)	04	06	08	25.99
2	Distribution of saplings (in laKh)	0.665	1.08	2.66	58.74
3	Earnings (in laKh)	3.00	4.86	11.97	58.60

Source: Sericulture wing, directorate of Industries HP.

The private nurseries have sold saplings of worth 4.86 and 11.97 laKh in the year 2018-19 and 2019-20, respectively. Sale of saplings recorded the growth of more than the growth in number of private nurseries which is an indication of improving productivity of these private nurseries. The Government owned nurseries need to replicate the practices adopted by the private nurseries or privatization of these nurseries can be thought of. A total number of 5.40 laKh mulberry saplings were distributed by both Government and private mulberry Nurseries in the year 2019-20, which benefitted 4,250, sericulturists/farmers in the state. The year-wise mulberry sapling distribution from both private and Government nurseries are given in table 4.5.

Further, table 4.5 shows the year-wise distribution of mulberry saplings which were 2,36,800 in the year 2016-17, benefitted 2,368 farmers in the State. These numbers increased in the year 2018-19 and 2019-20.The number of saplings distributed increased to 3,81,850 and 5,40,000 and benefited the 3,100 and 4,250 famers, respectively.

Table No. 4.5: Year-wise distribution of Mulberry Sapling in HP.

S. No.	Year	Distribution of Mulberry saplings	No. of farmers benefitted
1	2016-17	236800	2368
2	2017-18	313500	2567
3	2018-19	381850	3100
4	2019-20	540000	4250
CGR		22.88	15.74

Source: Sericulture wing, Directorate of industries, Himachal Pradesh.

4.5. Silkworm seed production inChawki rearing centers of Himachal Pradesh:

There are only two silkworm seed production centers in the State. These are at Palampur and Thunag in District kangra and District Mandi, respectively. The sericulture Department supplies silkworm under the controlled climatic conditions from chawkirearing centers to ensure better survival of infant worms. Chawki means the first two stages of silkworm rearing which require optimum temperature and humidity, hygienic condition, good quality tender leaves, good rearing facilities and, above all, technical skill. After that, these silkworms are supplied to the rearer for further processing. Year-wise data of silkworm seed production center Palampur is available and is captured in table no. 4.6.

Table No.4.6: year-wise silkworm seed production (in onz.)

S. No.	Year	Production of Cocoons (Kgs.)	Silkworm rearers (Nos.)	Silkworm Seed Production (onz.)
1	2012	1267	69	2367
2	2013	1180	84	2111
3	2014	1169	81	2069
4	2015	1176	108	2115
5	2016	1646	115	2774
6	2017	1457	123	2484
7	2018	1637	138	2924
8	2019	1394	126	2500

Source: Sericulture wing, Directorate of industries, Himachal Pradesh.

Although, cocoon production in Palampur silkworm seed production centre has fluctuated over the year, there appears to be a positive correlation between cocoon production, number of rearers provided cocoons and seed production. This correlation is stronger between the number of rearers provided cocoons and seed production leading to suggestion that a larger coverage of farmers is required to increase seed production and hence income of farmers.

4.6. Cocoon Production in H.P:

The hatched young silkworms are reared at government and private Chawki Rearing Centers and then are distributed for rearing indoors by the sericulture farmers at their premises for production of silk cocoons. The hatching to spinning cycle/ period of silk cocoons is only about 28 days to one month. In the year 2019-20, 228 MT, cocoons were produced by 10,632 sericulture farmers in the State.

The raw silk production which was at 32.12 MT in the year 2017-18, further increased slightly in 2018-19 to 33.90 MT, but production of raw silk declined to 31.00 MT in the year 2019-20. However, farmers engaged in sericulture and Mulberry sapling distribution to Seri-culturists show positive growth during above mentioned years as given in table 4.7.

Table No. 4.7: Growth of Sericulture in HP

Sr. No.	Particulars	Physical Progress			
		2017-18	2018-19	2019-20	CGR
1	Mulberry area (Ha.)	2454	2743	3183	9.06
2	Dfls. Intake (lakh No.)	7.23	7.50	7.50	1.23
3	Cocoon Production (MT)	241.00	250.50	228.00	-1.83
4	Raw silk Production (MT)	32.12	33.90	31.00	-1.17
5	Sericulture Farmers (No.)	10250	10485	10632	1.23
6	Mulberry sapling distribution (in lacs)	3.25	3.82	5.65	20.24

Source: Sericulture wing, Directorate of industries, Himachal Pradesh

4.7. Marketing infrastructure for selling of Cocoon, produced by Sericulturists in the state:

The silkworm cocoons are perishable and are hence, required to be reeled as early as possible. Sericulture Wing of Industries Department provides facility of temporary cocoon markets where the farmers can sell their silk cocoons. There is no permanent cocoon marketing facility in the state for silk cocoons. The Sericulture Wing of Industries Department of Himachal Pradesh, before harvesting of cocoons invites closed bids/ tenders from the prospective cocoon buyers/ traders from within and outside the state. The buyers who agree to buy silk cocoons at the rates decided by the committee are allotted choice-based market spots in order of preference. Spot payment to the producers is facilitated by the state Government.

The cocoon prices to farmers are given as per the quality/ grade of silk cocoons. Broadly, cocoons are classified into three grades i.e. A- grade, B grade and C grade. The average difference in the prices fetched of grade A and B cocoon is between Rs. 50 to Rs. 70 per Kilogram, whereas average price variation in the price of Grade B and Grade C cocoons is between Rs. 60 to Rs. 80 per Kilogram, respectively.

Table No.4.8: Average cocoon price fetched

Year	Price of cocoons (dry) Rs. /Per Kg			
	A- Grade	B- Grade	C- Grade	Average
2012-13	470-500	430-469	370-429	444
2013-14	525-550	500-524	475-499	512
2014-15	840-885	784-839	700-783	805
2015-16	650-700	600-649	500-599	616
2016-17	750-790	700-749	650-699	723
2017-18	850-902	800-849	700-799	817

Source: Sericulture Wing, directorate of Industries, Government of HP.

4.8. Silk reeling infrastructure of State:

Silk reeling is the process by which several cocoon braves are reeled together to produce a single thread called raw silk. The process of silk reeling includes cocoon drying, storage, sorting, deflossing, cocoon riding, reeling and hank making etc. Sericulture Wing of Industries Department provides expert advice and inputs to properly organize silk reeling centers to reel the yarn from the cocoon produced by rearers.

There are only two silk reeling units owned by the State Government while other 15 other silk reeling units are owned by the private entrepreneurs. Out of these 15 multi end reeling units 7 reeling units are alone in Kangra District, including, 2 multi- end- reeling units of Government sector which have been established at Nurpur in District Kangra. Four multi- end - reeling units and 3 cottage basin reeling units have been established in Ghumarwin Division of District Bilaspur. It clearly indicates that except two Districts of the State silk reeling infrastructure in other districts is not up to the mark and it requires to be strengthened to provide the silk reeling facilities to rearers at the nearest possible market. Considerable presence of private players in reeling, will encourage private entrepreneurs to establish reeling units in other Districts also.

Table No.4.9: silk reeling units in HP.

Sr. No.	Particular/Name of Division	Cottage basin reeling unit		Multi-end reeling unit	
		No.of units	No. of basins	No. of units	No.of Basins
A	**Govt. Sector**				
1	Silk technology Demonstration and Training centre Noorpur	0	0	02	20
B	**Private Sector**				
1	Ghumarwin	03	30	04	40
2	Palampur	01	06	04	28
3	Dehra	0	0	01	10
4	Mandi	0	0	01	06
5	Nadaun	0	0	02	20
6	Dhaulakuan	0	0	01	10
Total		04	36	15	134

Source: Sericulture Wing, Directorate of Industries, HP.

4.9. Schemes for development of silk industry:

State Government has been implementing various programmes of central Government through CSB, of India, for development of sericulture in the State. The details of these programmes are as under:

4.9.1. Catalytic Development Programme:

CDP is the flagships scheme of the Central Silk Board with the aim of encouraging and assisting enterprises for seed production, cocoon production, silk reeling, and processing etc. The major focus of the programme is to promote sericulture farming in the tribal and rural areas. The programme has been a major instrument of poverty eradication and creation of employment opportunities for sustainable livelihood. This scheme provides incentives to farmers/ reelers of mulberry plantation for new Sericulturists, rearing appliances, incentives for raw silk production, formulation, and implementation of community-based interventions. Incentives are also provided for infrastructure development for construction of Chocki Rearing Centers (CRCs) etc. The budget allocations have varied during three years given in table 4.10 as it is central Government's scheme and the availability of budgetary outlays under all central schemes is a direct function of the releases made by the Government of India.

Table No. 4.10: Fund utilized under Catalytic Development programme in HP.

S. No.	Year	Total Budget (Rs. In lacs)	Total Expenditure (Rs. In Lacs)	Families benefitted
1	2017-18	225.00	225.00	700
2	2018-19	75.00	75.00	720
3	2019-20	100.00	100.00	231

Source: Sericulture Wing, Directorate of Industries, Himachal Pradesh.

4.9.2. Silk Samagra Scheme:

The Government of Himachal Pradesh through Central Silk Board has been implementing this central sector Scheme. This is an Integrated Scheme for Development of Silk Industry (ISDSI) started during the year

2017-18. The aim and objective of the scheme is to scale up production by improving the quality and productivity and to empower downtrodden, poor & backward families through various activities of sericulture in the country. The Scheme comprises of four major components viz. (i) Research & Development, Training, Transfer of technology and IT initiatives (ii) Seed Organizations, (iii) Coordination and market development and (iv)Quality certification system/ Export brand promotion and technology up-gradation.

The budget allocation under the scheme for State of Himachal Pradesh for the benefit of Schedule Caste families under Silk Samagra Scheme In the year 2017-18, was Rs. 594.13 lakh and the entire budget was spent benefiting 300 Schedule Caste families. The assistance was available for construction of rearing houses, distribution of sericulture rearing appliances etc. During the year 2018-19, 1,500 SC families were benefitted by spending a budget of Rs. 908.44 lakh under the scheme. No assistance was available under the scheme from the central Government during 2019-20.

Table No.4.11: Assistance to SC and ST families under Silk Samagra Scheme.

Sr. No.	Year	Total Budget (in Lakh)	Total Expenditure (In Lakh)	families benefitted
A.	SC families benefitted			
1	2017-18	594.13	594.13	300
2	2018-19	908.44	908.44	1500
3	2019-20	0	0	0
4	2020-21	309.04	Data not available	179
B.	ST families benefitted			
1	2017-18	347.07	347.07	300
2	2018-19	390.53	390.53	200
3	2019-20	0	0	0
4	2020-21	237.23	Data Not available	135

Similarly, in the year 2017-18, total sum of Rs. 347.07 lakh was utilized under the scheme benefitting 300 Schedule Tribe families while in year 2018-19 and 2020-21, the budget of Rs. 390.53 lakh and 237.23 lakhs were allocated under the scheme which benefitted 200 and 135 of ST families, respectively.

4.9.3. Rastriya Krishi Vikas Yojna sericulture farming:

The funds under Rastriya Krishi Vikas Yojna (RKVY) are being provided to develop farming as a main source of economic activity. The yojna also seeks to help farmers to increase their income by encouraging productivity & promoting value chain addition linked production models, and finally to reduce the risk of farmers by focusing on empowering the youth through providing them training or improve the skill of manpower engaged in agriculture/ sericulture and other farming activities.

Table No. 4.12: Government expenditure under RKVY Scheme to assist the silk farming

Sr. No.	Year	Total Budget (Rs. In Lakh)	Total Expenditure (Rs. In lakh)
1	2018-19	125.04	125.04
2	2019-20	100.00	100.00
3	2020-21	200.11	Not available

Source: Sericulture Wing Directorate of Industries, Himachal Pradesh

Under Rastriya Krishi Vikas Yojna, central government provided budget of Rs. 125.04 lakh in the year 2018-19 for the development of sericulture farming in the state while in the year of 2019-20 and 2020-21 the budget of Rs. 100 lakh and Rs. 200.11 lakh respectively were provided and spent under the scheme.

4.9.4. Special Central Assistance Programme:

The main objective of the scheme is to increase the income of the target population by way of various income generating schemes, skill development and development of infrastructure etc. so that targeted groups/ population could be brought above the poverty line. Under this

programme, farmers belonging to Schedule Caste have been provided assistance for mulberry plantation on their own land with an objective to increase their income. Fund flow as Special Central Assistance to the State Government is dependent on the allocations made by the Government of India under this programme and hence the number of beneficiaries, during a year, getting assistance would depend on the release made by the Central Government during that year. There was no assistance available from the Government of India during 2018-19 whereas, the year 2019-20 witnessed an impressive increase in releases from the Central Government and so did the number of beneficiaries.

Table No. 4.13: Budget utilization under special Central Assistance programme for the development of silk farming in Himachal Pradesh

Sr. No.	Year	Total Budget (Rs. In lacs)	Total Expenditure (Rs. In lacs)	Nos. of Families benefitted
1	2017-18	87.00	87.00	1500
2	2018-19	0	0	0
3	2019-20	255.00	255.00	6000
4	2020-21	55.00	Data not available	Data not available

Source: Sericulture Wing Directorate of Industries, Himachal Pradesh.

4.10: Summing up:

Out of 8 Sericulture Divisions in State, Mandi is the largest Division in terms of presence of maximum number of Sericulture Centers in it. Presence of Silk Reeling and Twisting Units and Silk Handlooms in the private sector is an encouraging sign to acquire competitiveness in the national and international markets. Marketing too is largely a responsibility of the private sector in the State.

The largest area occupied by the mulberry farms is in Ghumarwin and Mandi Sericultural Divisions which jointly occupy about 50% of the total area under mulberry farms in all the eight Sericulture Divisions of the State, yet Palampur Sericulture Division which has only 16.31% area under mulberry farms has the largest numbers of mulberry trees amongst all the Sericulture divisions.

A remarkable feature about production and distribution of mulberry saplings in the State has been a considerable presence of private nurseries. The distribution of saplings by private nurseries has increased almost four times from 2017-18 to 2019-20. The incentive to earn profit and maintaining quality by the private nurseries are the possible reasons for success of these nurseries. The State Government needs to review its policy to continue with the loss making Government owned nurseries and encourage private nurseries to meet entire demand for saplings.

The cocoon production and silkworm seed production by the State owned Chawki Rearing Centers has remained stagnant since 2012. It is a matter of separate enquiry by the implementing department to access the reason for this stagnation. The demand and supply gap and based on the assessment, of reasons for this gap, correcting measures are required to be taken by the implementing department/ agency. When compared with the total cocoon production of the State during 2017, 2018 and 2019, the cocoons produced by the State owned Chawki Rearing centers are negligible in comparison to the total production. Total number of farmers engaged in sericulture has also not increase much indicating to the saturation having been achieved in this field by the State. If this is the case, time is now ripe to focus on building a value chain with proper marketing linkages. However, the implementing department must also work out a strategy to motivate more and more farmers to resort to this activity as an income supplementing secondary occupation.

The State Government has windows to get funding from the Government of India for development of sericulture in the State. The department can think of developing a strategy to utilize the funds in convergence with all the programme/s schemes so that maximum benefits accrue to the beneficiaries under the schemes.

CHAPTER-5

SOCIAL STRATIFICATION, INPUTS & OPERATIONS

5.1 Introduction:

Sericulture is agro based labour intensive cottage industry which requires low investment and provides quick returns on investment because of its small gestation period. It is an important economic activity which includes both on farm as well as off farm activities related to silkworm rearing. The sericulture plays a key role in the up-liftment of rural population as it provides self-employment and additional income to farmers especially, to farmers who have small land holdings, and to the marginalized and weaker sections of society. Presently, Sericulture is developing as an important rural income generating subsidiary occupation to augment the income of agrarian community in the State.

5.2. Social stratification:

This section profiles the sample of sericulturists selected from four sericulture Divisions of Himachal Pradesh on social and economic parameters. The gender-based profiling of sericulturists is given in table 5.1. The table shows that more percentage of women than men are engaged in sericulture farming to earn their livelihoods (75%). Not only that the women have higher participation in sericulture in the State, but the policy also has its orientation towards extending benefits to the weaker section of the society like Schedule Castes and those belonging to other Backward Classes which constitute about 62.5% and 6.67% respectively of total sample interviewed. Himachal Pradesh has a history of following the path of inclusive growth by following the principle of leaving no one behind.

Table No. 5.1: Genderprofile of Beneficiaries(Percentage)

S.No.	Particular	Division				Overall
		Ghumarwin	Dehra	Nadaun	Mandi	
A	**Male**					
1	General	0	0	27.27	73.68	56.67
2	SC	0	0	54.55	21.05	33.33
3	OBC	0	0	18.18	5.27	10.00
B	**Female**					
1	General	30	0	21.05	63.64	22.22
2	SC	70	100	57.90	27.27	72.22
3	OBC	0	0	21.05	9.09	5.56
C	**Overall (A+B)**					
1	Male	0	0	36.67	63.33	25
2	Female	100	100	63.33	36.67	75

Source: primary data collected fromfield survey.

5.3. Awareness among beneficiaries:

Departmental publicity material was found to have the least reach to the beneficiaries. A very large proportion of the beneficiaries came to know about the scheme being implemented by the government through friends and relatives. Considerable proportion of beneficiaries had known about the kind of assistance available and other features of sericulture schemes of the government through print media other than departmental publicity material. About 28 percent of the beneficiaries got awareness about these schemes after they visited the office of the implementing department (table 5.2). A direct interaction with people by the departmental officials through extension services was found to be lacking. A word from friends and relatives indicate to a closely knit social fabric in the rural families in State. Poor reach of department through its website indicates to digital illiteracy of the target farmers. Efforts are required to be made by the departmental officials to draw a strategy to motivate farmers to undertake sericulture by contacting them directly through seminars, public meetings, by taking into look panchayat level officials etc. More frequent visits of the officials into the field would certainly be beneficials in convincing farming communities that sericulture can be helpful in supplementing their income with minimal investment especially, when a large financial assistance is available through various schemes being implemented by the Government.

Table No.5.2: Reach throughvarious publicity media

S.No.	Particulars	Division		(Percentage Beneficiaries)		
		Ghumarwin	Dehra	Nadaun	Mandi	Overall
1	Deptt. Publicity Print	6.67	3.33	6.67	0	4.17
2	Friend/ Relations	23.33	66.67	40	16.67	36.67
3	By Visit the Deptt.	6.67	20	20	63.33	27.50
4	Website of Deptt.	0	3.33	0	0	0.83
5	Electronic Media	0	0	0	3.33	0.83
6	Other Print Media	63.33	6.67	33.33	16.67	30
	Overall	100	100	100	100	100

Source: Field survey

5.4. Average land size used for mulberry Plantation:

Land size ownership of the farmers is one of the important determinants of the scale of sericulture operations undertaken by the farmers. The average land holding with the beneficiary farmers was a little more than half a hectare. In fact, this holds true with the entire State as about 90 percent of the farmers in the State either have small or marginal land holdings. The average area of land under mulberry plantation comes out be 0.16 hectares which indicates to small scale of operation by the beneficiaries. If the average proportion of total land owned used for mulberry plantation is considered, which is around 33 percent in the Sericulture Divisions taken together, it is a considerable proportion of total land used for the purpose. It indicates that mulberry plantation is being pursued as one of the main income supplementing activities by the farmers. An important inference that can be drawn is that the farmers have a clear preference for mulberry plantations over other traditional crops as about one thirds of the total land is under mulberry plantation despite the fact that total land ownership is about half a hectare. A possible reason for this can be relatively higher returns from mulberry plantation than from other traditional crops. It can also be inferred that average land size which can safely be turned as economically viable in the State for mulberry plantation is about 0.16 hectares as given in table 5.3.

Table No. 5.3: Land ownership and used for growing mulberry tree

Sr. No.	Particular	Division				
		Dehra	Ghumarwin	Nadaun	Mandi	Overall
1	% of Landunder mulberry trees out of total land holding	29.28%	28.64%	38.90%	34.30%	32.54%
2	Average land holding (in hectare)	0.46	0.55	0.46	0.55	0.51
3	Average land used for growing mulberry trees under sericulture (in hectare)	0.13	0.16	0.18	0.19	0.16

Source: Field survey
Note: Figures in the parentheses indicate percentages of the total in the respective category

5.5. Mulberry Plantation, Saplings availability, Survival rate and other facilities:

All the saplings distributed in all four selected Sericulture Divisions were planted by the farmers, however, survival rate of the plantations was the Dehra Sericulture Division. Per hectare density of mulberry plants was observed in Mandi Sericulture Division. Demand for saplings in Ghumarwin Sericulture Division was the highest as can be inferred from the observation that the highest number of saplings was distributed in this Division. The survival rate was also the highest in Ghumarwin Division and so was the mulberry plants density per hectare in it. The variation in survival rate in the selected Sericulture Divisions was not much however, a great variation in the number of mulberry plants per hectare was observed. Mandi Division had only 519 plants per hectare as compared to 1,564 in Ghumarwin. The implementing Department need to assess if the prescribed scientific practices are being followed by the farmers in the areas where per hectare mulberry plants were less than what had been observed in Ghumarwin. The extension staff also needs to educate farmers about the practices helpful in increasing survival rate of mulberry plantations.

Table No.5.4: Mulberry plantation and survival rate:

Sr.No.	Particulars	Division				
		Ghumarwin	Dehra	Nadaun	Mandi	Overall
1	Mulberry plants Provided by Deptt. (In Nos.)	6320	3950	4500	2950	17720
2	Mulberry Trees planted by farmers (in Nos.)	6320	3950	4500	2950	17720
3	Mulberry trees survived after plantation (In Nos.)	3620	1820	2417	1365	9222
4	Per hectare plantation of Mulberry Trees (In Nos.)	1564	837	833	519	897
5	Survival rate of Mulberry Plantation (%)	57.28	46.08	53.71	46.27	52.04

Source: Field survey

Farmers, knowledge about the appropriate distance between plantation of mulberry trees along with irrigation facilities is important for an increment in the survival rate of the plantations. The most appropriate distance between mulberry plantation has been recommended between 6-8 feet to maximize the survival rate. The survey revealed that a very large proportion of the beneficiary farmers maintained the distance of 4-8 feet between mulberry plantation (78 percent). In fact, about 48 percent of the farmers were found to have planted them at a distance of4 to 5 feet. Same pattern was observed across all the sericulture Divisions with a small exception in Ghumarwin where about 30 percent of the farmers planted mulberry saplings at an average distance of 2-3 feet. Incidentally, Ghumarwin has also recorded highest survival rate of the planted material, though there is no evidence to relate it with the distance of 2-3 feet between saplings planted.

Table No.5.5: Average Distance Between mulberry plants during Plantation

Sr.No.	Distance between Mulberry Plants (in Sq Feet)	Division (Percentage households)				
		Dehra	Ghumarwin	Nadaun	Mandi	Overall
1	2-3	13.33	30.00	10.00	6.67	15.00
2	4-5	56.67	46.67	46.67	40.00	47.50
3	6-8	30.00	23.33	30.00	40.00	30.83
4	8-10	0	0	10.00	6.67	4.17
5	Above 10	0	0	3.33	6.66	10.00
Overall		100	100	100	100	100

Source: Field survey

The beneficiaries were also asked to reveal the number of years for which they had been following sericulture as their main or supplementary means of livelihood. It was revealed that the farmers of Mandi Sericulture Division had been into sericulture far the longest time. About 67% of the farmers in this Division had an experience of more than 20 years in sericulture. This occupation was found to be relatively new in the Ghumarwin sericulture Division where about 73 percent of the farmers had started sericulture less than twenty year ago. The farmers in other two Sericulture Divisions with an experience of 10 to 25 years constituted the highest proportion of beneficiaries.

Table No. 5.6: Sericulture farming experience of beneficiaries in study area.

Sr.No.	Sericulture experience (in Years)	Percentage Beneficiaries in various Divisions				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	2-5	3.33	6.67	13.33	3.33	6.67
2	6-10	23.33	33.33	20.00	10.00	21.67
3	11-15	16.67	20.00	23.33	10.00	17.50
4	16-20	30.00	20.00	23.33	10.00	20.83
5	21-25	16.67	10.00	13.33	30.00	17.50
6	26-30	10.00	6.67	6.67	20.00	10.83
7	>30	0	3.33	0	16.67	5.00
Total		100	100	100	100	100

Source: Field survey

5.6. Separate Rearing Houses:

A separate rearing house for silkworms is highly recommended to avoid exposure to any serious infections and diseases to the farmers. It was only in Mandi Sericulture Division that all the beneficiaries were found to be following the practice of having a separate rearing house whereas, only 10 percent of the beneficiaries had a separate rearing house in Nadaun Division. Considering large proportion of beneficiaries, both in Dehra and Ghumarwin sericulture Divisions, had a separate rearing house and only a small percentage was using a room within the premises of their house as the rearing house. The implementing Department has a role to educate beneficiaries especially in Naduan Sericulture Division about its effects of not having a separate rearing house on their health.

Average cost of construction of a separate rearing house has been found to be about two lakh rupees. About 50 percent of the total cost had been contributed by the beneficiaries whereas, another half of the cost was made available to the beneficiaries by the Government in the form of subsidy under various schemes being implemented by it. However, considerably low cost of construction of a separate rearing house in Nadaun Sericulture Division needs to be analyzed by the implementing Department to explore the possibility of replicating the practices identified thereafter in other Districts also.

Table No. 5.7: The Details of Separately constructed rearing houses in study area and per household subsidies provided by Government.

Sr.No.	Particulars	Division				Total
		Dehra	Ghumarwin	Naduan	Mandi	
1	% 0f beneficiarieswith separate Rearing House	90.00%	83.33%	10.00%	100%	70.83%
2	Average construction cost of Rearing House	1,92,370	2,24,240	1,23,333	2,08,897	2,04,153
3	Per household Own investment for construction of Rearing house	89،333	1،17،680	80،000	1،01،552	1،01،224
4	Per household subsidies provided by Deptt . for construction of Rearing House	1,03,037	1,06,560	43,333	1,07,345	1,02,929

Source: Field survey

5.7. Tools and implements ownership:

It was found that Nets, Disinfectants, Trays, Iron Stands and Buckets required for sericulture were owned almost by all the farmers with a few exceptions. Only 17 percent beneficiaries of Mandi Division owned the heater for maintaining the temperature in rearing house whereas the heater ownership in other sericulture Divisions was almost universal. Implementing Department can determine the reasons for a low ownership of heater in Mandi if it was due to warm climate in the region which does not necessitate use of the heater, or it was because of some other reason and can try to address the issue accordingly. Similarly, law incidence of ownership of a blower and a pump needs to be analyzed and addressed by the implementing department. Lack of knowledge or affordability, are if identifies as the possible reasons, can be easily addressed by the implementing department.

TableNo.5.8: The Equipment Detail of sericulture beneficiaries in Study Area (percent)

Sr.No.	Rearing Equipment /items	Division				Overall (120)
		Dehra (30)	Ghumarwin (30)	Nadaun (30)	Mandi (30)	
1	Net	96.67	90.00	100	100	96.67
2	Heater	96.67	90.00	80.00	16.67	70.83
3	Disinfect	96.67	90.00	100	100	96.67
4	Tray	96.67	90.00	90.00	100	94.17
5	Iron Stand	96.67	86.67	96.67	100	95.00
6	Tub	0	46.67	0	0	11.67
7	Bucket	83.33	133.33	46.67	93.33	89.17
8	Blower	53.33	76.67	43.33	76.67	62.50
9	Pump	46.67	0	0.00	43.33	27.50

Source: Field survey

5.8. Seed distribution by the Government:

Availability and quality of silkworm seed are major determinants of the production and quality of the silk produced. The sericulture wing of the Industries Department is largely responsible for making available the silkworm seed to the farmers. It was found that an average of one ounce of silkworm seed was received by a beneficiary household which had an average size of about 0.16 hectare of land used for mulberry production. This implied that the rearing houses available with the farmers were big enough to rear one ounce of silkworm seeds. Another inference that can be drawn that the mulberry leaves obtained from the trees grown in 0.16 hectare of land were adequate to feed silkworms produced from one ounce of silkworm seeds. The farmers were not satisfied with the quality of silkworm seeds being supplied by the Government. The seeds supplied by the Government yielded the silkworms of small size which had very law survival rate. They also responded by saying that occasionally the quality of silkworm seeds produced turned out to be good. They had no option but to rely on the silkworm seed supplied by the Government in the absence of any other source of silkworm seeds.

Table No.5.9: Detail of silkworm seed received by Beneficiaries in study area (In oz)

Sr. No.	Seed Received (oz)	Division (Percent Beneficiaries)				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	<1 (oz)	10.00	13.33	10.00	6.67	10.00
2	1 (oz)	76.67	70.00	86.67	86.67	80.00
3	>1 (oz)	13.33	16.67	3.33	6.67	10.00
	Overall	100	100	100	100	100
4	Total Seed received by all the beneficiaries (oz)	30.5	31	29	30	120.5
5	Average silkworm seed received by each beneficiary (oz)	1.02	1.03	0.97	1.00	1.00

Source: Field survey

Summing Up:

The sericulture in Himachal Pradesh, has not been taken up as an important activity to supplement income from agriculture by a few only. Women and other marginalized sections of farmers are well represented in the entire operation of sericulture. Considerable preparation of average land holding under sericulture through average farm size under sericulture is very small. This is possibly a result of small land holdings owned by the farmers. A great variation in the mulberry plant density per unit area across the areas necessitates strengthening and reorientation of extension services to ensure that all farmers observe the most desirable distance between mulberry plants so as to maximize the benefits.The same applies for convincing and motivating farmers to have a separate rearing house away from their dwelling premises. Wide variations in use of prescribed tools and implements requires an examination by the department and necessary changes are required to be made in the approaches to incentivize farmers to use them. Poor reach of departmental publicity efforts also needs corrective measures.

CHAPTER-6

ECONOMIC EMPOWERMENT OF SERICULTURE FARMERS

6.1. Introduction:

Historically, Himachal Pradesh has been one of the State with the lowest per-capita contribution to the gross State Domestic Product (GSDP) from agriculture sector indicating to law productivity of agriculture in the State. Widely dispersed farms of relatively smaller size, poor road connectivity and extreme climatic conditions result in high transportation cost of taking both agricultural produce to the market and raw material taking to the field which, in turn, contribute to law productivity of agriculture in the State. Relatively recent practice of farmers of the State to diversify their operations into cultivation of off-season vegetables has certainly added to their income. However, not all areas have sufficient irrigation facilities necessary for cultivation of vegetables. Given the circumstances, sericulture can be one of the alternatives which could supplement farmers' income due to its labour-intensive nature and law gestation period. It can create employment for additional hands too. This chapter makes an attempt to assess the impact of sericulture in the selected sericulture divisions on the income of farmers engaged in this activity and also as to what extent sericulture helps in generating employment.

6.2. Sericulture Operations:

Most of the sericulture operations like digging of pits, ploughing, planting material collection, application of manure, leaves transplantation, leave preservation, chocki rearing and others are all labour-intensive activities and have potential for generating employment. However, the operations of sericulture activities in the State are only seasonal and hence therefore

activities generated only seasonal employment. Even then sericulture has been instrumental in supplementing income of farmers of the State as would be established in the following text with the help of the information collected.

6.3. Employment generated:

An attempt was made to make an assessment of the employment generated in taking up the sericulture as an income supplementing activity by the farmers of the State. The respondent farmers were asked to provide information about the number of persons employed by gender in the initial year of its operation and the number of persons employed in its operation in 2019-20 i.e., in the year in which the survey was conducted. This helped in giving an idea about the change in manpower requirement in sericulture over the years after the initial year of starting it. It was observed from the information provided by the beneficiary households that the number of persons employed in the sericulture per household has not changed over the years indicating to at least two things. First, the households which opted for sericulture as an income supplementary activity have not increased their scale of operations over the years. Second, the externalities and other benefits of prolonged operations have really not worked in favour of farmers as the required number of working hands has not changed over the years which is indicated from the observation that the total number of persons employed over a fixed proportion of land under sericulture has also not changed much during these years.

An attempt has also been made to ascertain number of persons finding employment per hectare of land under sericulture. Since the average land size under sericulture in Himachal Pradesh is extremely small, the information provided by all the respondent households was in Bighas which is commonly used unit of measurement of land in the State. There is also a little variation in the number of square meters in each Bigha of land as a measurement of land across the State and it varies from about 740 squaresper Bigha to about 844 square meters per bigha. An average of 12.5 Bigha has been assumed to be constituting one hectare of land in

Himachal Pradesh in consultation with the agriculture Department of the State Government. After converting the total size of land under sericulture from Bighas into hectare, number of persons employed in per hectare of land under sericulture has been achieved for each Sericulture Division and for the entire State separately to get an idea of the employment provided by sericulture in the State.

It is found that an average of 16.78 persons have got employment per hectare of land under sericulture in Himachal Pradesh. Ghumarwin Sericulture Division despite having the lowest measurement of land under sericulture (just 4.04 hectare) has provided employment 22.03 persons per hectare of land under sericulture which is much more than the State average and is also maximum amongst all the four Sericulture Divisions that were surveyed. The practices being followed in Ghumarwin Division need to be observed closely by the executing department and possibilities of replicating the lessons learnt in other areas be explored. Special attention of the executing department is needed in Nadaun and Dehra Sericulture Divisions in which, the employment provided per hectare land under sericulture is much below the State average. Sericulture Division-wise employment figures have been exhibited in table 6.1.

Table No. 6.1: Employment per hectare land under sericulture

S. No.	Sericulture Division	Land under Sericulture (Bigha)	Land under sericulture (Hectare)	No. of person employed in sericulture	Employer per hectare of land under sericulture
1	Dehra	59.0	4.72	69	14.62
2	Ghumarwin	50.5	4.04	89	22.03
3	Nadaun	67.5	5.40	71	13.15
4	Mandi	71.0	5.68	104	18.31
5	Total	248.0	19.84	333	16.78

Source: Field Survey

Table 6.2 provides gender desegregated information with regard to the employment provided during the initial year when the household entered into sericulture and also during the year in which the survey was conducted i.e., 2019-20. It is observed from the table that relatively more women are employed in this sector in comparison to men and this proportion has largely remained same over the years even though the absolute number of persons employed- both men and women has increased during the period under consideration. An extremely encouraging observation that has been noticed is that no rejection of any of the persons employed in this sector is noticed during the period between initial year of sericulture operations and 2019-20. Employment assurance in this occupation indicates to lay term sustainability of sericulture in supplementing incomes of the farmers in State.

Table No.6.2: The Detail of the Persons got Employment from sericulture farming in study area.

S. No.	Nos. of Persons got Employment	Division		(Persons in Nos.)		
		Dehra	Ghumarwin	Nadaun	Mandi	Overall
1	**At the First Year of Operation**					
a	Male	29 (42.65)	39 44.83)	30 (43.48)	39 (42.39)	137 (43.35)
b	Female	39 (57.35)	48 (55.17)	39 (56.52)	53 (57.61)	179 (56.65)
c	Total	68 (100)	87 (100)	69 (100)	92 (100)	316 (100)
2	**In the Year 2019-20**					
a	Male	29 (42.03)	40 (44.94)	31 (43.66)	47 (45.19)	147 (44.14)
b	Female	40 (57.97)	49 (55.06)	40 (56.34)	57 (54.81)	186 (55.86)
c	Total	69 (100)	89 (100)	71 (100)	104 (100)	333 (100)

Source: Field survey. Note: Figures in the parentheses indicate percentages of the total in the respective category

6.4. Seasonality:

However, the number of persons who found employment in sericulture operations need to be read in conjunction with the number of total mandays generating during a year through engagement in sericulture.

Table 6.3 shows that on an average a person gets employment for 26.33 days in a year if it is assumed that the employed individual works for eight hours on all the days, he gets employment in sericulture. However, it can be seen that the average time an employed individual spends in sericulture and related activities in a day is 4 fours. Hence, actual employment an individual gets in a year by undertaking sericulture and related activities is 52.66 days limiting the working hours to four hours a day. Although, sericulture is a labour- intensive activity and has a potential of generating income through providing employment in the number of days for which the employment is provided to few in a year. The findings are supported with the fact that silkworm crops are taken twice in a year. Once in spring season i.e. during March to April and another in the autumn season i.e. in the months of September and October. Thus, the seasonality in silkworm yield restricts the employment only to a few days during a year. The autumn season in Himachal is relatively cold as compared to many other plain areas and hence the average silkworm yield is law during autumn season. This stops many farmers from undertaking sericulture operations in autumn season in Himachal Pradesh.

Table No.6.3: Average annual employment generating by sericulture activities for an individual.

S. No.	Sericulture Division	Average daily employment from sericulture (hours/mandays)	Total Mandays generated (@four hours daily)	Total employment generated in standard mandays (@ 8 hours daily)	Total persons employed	No. of full mandays for which a person is employed in a year
1	Dehra	4 hours/half manday	3865	1933	69	28.01
2	Ghumarwin	4hours/half manday	4530	2265	89	25.44
3	Nadaun	4 hours/halfmanday	3940	1970	71	27.75
4	Mandi	4 hours/halfmanday	5200	2600	104	25.00
	Total	4 hours/half manday	17535	8768	333	26.33

Source: Field Survey

Agriculture sector requires diversification so that further employment opportunities are be created. Sericulture is the best option which has a lot of potential to generate employment and also has the potential to increase the annual income of engaged farmers as the table 6.4 captures some more information related to employment. Agriculture sector as a whole was providing an average employment of 226 man-days to a person in a year. This was inclusive of the employment of 26 man- days created from sericulture farming.

Table No.6.4:Some other information related to sericulture.

S. No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	No. Of persons engaged in ser iculture activities during Initial year of Sericulture Farming.	68	87	69	92	316
2	No. Of persons engaged in sericulture activities during the year 2019-20.	69	89	71	104	333
3	Total Employment created by Sericulture during Initial year of Sericulture Farming (in mandays)	2080	2605	2045	2635	9365
4	Total Employment created from Sericulturefarming during the year 2019-20. (in Mandays)	1933	2265	1970	2600	8768
5	Perperson average annual employment created by Sericulture duringInitial yearof Sericulture Farming (in mandays)	31	26	30	29	30
6	Per person average annualemployment created by Sericulture farming during the year 2 019-20. (in mandays)	28	25	28	25	26
7	Per person annual employment created from other Agriculture Activities during Initial year of sericulture farming (in mandays)	198	233	199	163	198
8	Per person annual employment generated from other Agriculture Activities during the year 2019-20. (in mandays)	189	220	225	166	200
9	Perhousehold total annual employment from sericulture farming about 20 years ago (in mandays)	69	87	68	88	78
10	Per householdtotal annual employment from sericulture farming during the	64	76	66	87	73

Source: Field survey

6.5. Annual Cocoon Production in study area:

High average yield of crop and quantity & quality production of cocoon are essential for better returns from sericulture farming. An attempt has been made to analyze the season-wise annual production of cocoons in study area, the results of which are presented in table 6.5. It can be noticed from the table that two crops of mulberry silkworm cocoons were raised by all the beneficiaries. The spring crop contributes largely to the total annual production producing about 80 percent of total annual production of cocoon in study area.

Per household annual production of cocoon was also calculated. Mandi Division had the highest per household production of cocoon with 12.67 Kg followed by Ghumarwin and Nadaun Divisions. The lowest was reported in Dehra Division with an average annual cocoon production of 9.87 kg per household cocoon production in spring crop was recorded at 9.21 kg while during autumn season, per household production of cocoon was recorded only 2.14 kg. This observation leads to inferring that the climatic conditions existing in autumn are not very conducive for silk worm cocoon production and there is a strong possibility of farmers being employed unproductively in this occupation during autumn in Himachal Pradesh.

Table No. 6.5: Annual Average Cocoon Production

(Kg)

Sr. No.	Particulars	Division				
		Dehra	Ghumarwin	Nadaun	Mandi	Overall
1	**Cocoon Production in 1st Year of Sericulture Farming**					
a	In Spring	253	286	274	379	1192 (79.04%)
b	In Autumn	69	91	77	79	316 (20.96%)
c	Total	322	377	351	458	1508 (100%)
d	Per household annual cocoon Production	10.73	12.57	11.70	15.27	12.57
2	**Cocoon Production in Year 2019-20**					
a	In Spring	238	270	266	331	1105 (81.13%)
b	In Autumn	58	79	71	49	257 (18.87%)
c	Total	296	349	337	380	1362 (100%)
d	Per household annual cocoon Production	9.87	11.63	11.23	12.67	11.35

Source: Field survey. Note: Figures in the parentheses indicate percentages of the total in the respective category

Table 6.6 give an idea about annual per hectare yield of silk warm cocoons. Average annual yield, combined for spring and autumn seasons, per hectare was worked out to be 68.65 Kg/hectare. Ghumarwin sericulture division had reported highest per hectare yield of 86.39 Kg while the lowest per hectare yield was reported in Nadaun at 62.40Kg. This variation in yield needs to be looked into and reasons for variation explored by the executing department.

Table-6.6: Cocoon Production per hectare land under sericulture

S. No.	Division	Total land under sericulture (Hectares)	Total cocoon produced (kg)	Per hectare yield
1	Dehra	4.72	296	62.71
2	Ghumarwin	4.04	349	86.39
3	Nadaun	5.40	337	62.40
4	Mandi	5.68	380	66.90
5	Total	19.84	1362	68.65

Source: Field survey.

6.6. Per Kg Average Price of cocoon received by sericulturists in study area:

Table 6.7shows average price of cocoon received by sericulturists for each season separately. The table shows that per Kg cocoon price has increased marginally Rs. 654, in initial years of sericulture farming (about 20 years back) to Rs.796 per Kg in the year 2019-20. However, this increasing trend observed in the prices fetched by the farmers by selling them in the market needs to be interpreted with caution. The prices indicated in the table are nominal prices and if these prices are depleted using price indices, an actual fall in the prices fetched may be observed. Here is an important responsibility that can be assigned specifically to the executing department, and which is to ensure right prices for the farmers' produce by establishing robust market linkages. Also, there was variation in average cocoon price across the sericulture Divisions.

Table No. 6.7: Per Kg Average price of Cocoons received (Rs.)

Sr. No.	Particulars	Division				Overall
		Dehra	Gumarwin	Nadaun	Mandi	
1	**Per Kg Cocoon Price in 1st Year of Sericulture Farming**					
a	Spring season	756	703	687	633	695
b	Autumn season	527	500	537	422	497
c	Average price	707	654	654	626	654
2	**Per Kg Cocoon Price in Year 2019-20**					
a	Spring season	860	849	976	787	868
b	Autumn season	561	417	538	538	514
c	Average price	801	751	884	745	796

Source: Field survey.

6.7. Gross household Income from Sericulture:

Sericulture farming has turned out to be an important supplementary sources of household income accounting about 11percent of the total agriculture income in Himachal Pradesh. The highest average per household income from sericulture was assessed at Rs. 9,927 In Nadaun Division followed by Mandi Division with per household average income of Rs. 9,567. overall average per household annual income from sericulture in the study area was assessed at Rs.9034.

It can also be observed that the cocoon production has actually decreased in 2019-20 in comparison to what it used to be during the initial year of operations. However, no clear production trend can be established in the absence of availability of data for interviewing period. Financial year 2019-20 may have been a bad year for cocoon production due to any of the factors like adverse weather conditions etc. Similarly, no certain trend in terms of prices fetched by selling cocoons can be arrived at based on the available information. Table 6.8 makes an attempt to estimate average per house income generated from sericulture in the initial year of sericulture operations and in 2019-20 separately.

Table No. 6.8: Per Household Annual Income from Sericulture

(Rs.)

S. No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
A	**Per household annual income in 1st Year of Sericulture Farming**					
1	Total Annual Cocoon Production (In Kg)	322	377	351	458	1508
2	Per Kg Average Cocoon Pricereceived by household (in Rs.)	707.02	653.85	654.42	625.84	653.51
3	Gross annual Income from sericulture framing (in Rs.)	2,27,660	2,46,500	2,29700	2,86,634	9,85,493
4	Per household annual income from sericulture farming (in Rs.)	7,589	8,217	7,657	9,554	8,212
B	**Per Household annual income from Sericulture Farming in Year 2019 -20**					
1	Total Annual Cocoon Production (In Kg)	296	349	337	380	1362
2	Per Kg Average Cocoon Price received by household (in Rs.)	801.11	751.09	883.68	745.45	795.93
3	Gross annual Income from sericulture framing (In Rs.)	2,37,130	2,62,130	2,97,800	2,83,271	10,84,060
4	Per household annual income from sericulture farming (In Rs.)	7,904	8,738	9,927	9,442	9,034

Source: Field survey

6.8. Contribution of Sericulture in Gross Annual Income of Agriculture sector:

Sericulture has helped in generating additional income contributing to the gross annual income of farmers from agriculture sector. It can be observed from the table 6.9 that sericulture farming has contributed about 10.91% in gross households' income from agriculture sector. Considering that sericulture occupies only about a little more than two months of the entire year of farm operations, it is an important source of income for farmers of Himachal Pradesh and needs to be promoted further with the specific focus on increasing its productivity possibly, by exploring the technical innovations in the field and helping farmers to get better returns from market.

Table No.6.9: Average Household Annual Income from Agriculture sector in Study Area

S. No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
A	**Per household annual income from Agriculture sector about 20 years before**					
1	Gross Annual Income from Sericulture Farming	2,27,660	2,46,500	2,29,700	2,81,630	9,85,490
2	Gross Annual Income from Other Agriculture Activities	19,60,000	10,82,000	14,45,000	15,65,000	60,52,000
3	Total Annual Gross income from Agriculture sector (1+2)	21,87,660	13,28,500	16,74,700	18,46,630	70,37,490
4	Per household annual income from Agriculture sector	72,922	44,283	55,823	61,554	58,646
B	**Per household annual income from Agriculture sector in the Year 2019-20**					
1	Gross Annual Income from Sericulture Farming	2,37,130	2,62,130	2,97,800	2,87,000	10,84,060
2	Gross Annual Income from Other Agriculture Activities	26,50,000	18,70,100	20,75,000	22,56,800	88,51,900
3	Total Annual Gross income from Agriculture sector (1+2)	28,87,130	21,32,230	23,72,800	25,43,800	99,35,960
4	Per household annual income from Agriculture sector	96,238	71,074	79,093	84,793	82,800
C	**% Share of sericulture income in total agriculture income**					
1	% Share of sericulture income in total agriculture income about 20 years before	10.41	18.55	13.72	15.25	14.00
2	% Share of sericulture income in total agriculture income in year 2019-20	8.21	12.29	12.55	11.28	10.91

Source: Field survey.

6.9: Summing up:

Although the sericulture, in Himachal Pradesh, can only be practiced for about two months in a year, it has a potential to generate employment and income that can supplement the income of the farmers from other on farm and off- farm activities. There appears to be a scope for introduction of technical interventions as a large proportion of the work is still being done manually. That certainly has a danger of displacement of some persons from this occupation. A strategy is required to ensure that the persons ejected from sericulture after introduction of technological interventions are provided employment in some other activities in such a manner that they do not get worse-off after engaging in new activity. Considering that only a short period is spent in sericulture activities and too a large proportion of the labour employment are members of the household, this

will not only increase productivity of sericulture operations but will also provide opportunities to the labour engaged to find more gainful employment in other more productive on- farm or off- farm activities.

The prices fetched from sale of silkworm cocoons have not increased much during the course of previous years. It may just be of those years when the farmers failed to get right prices as the scope of the present study did not permit the movement of prices during a period of few years. However, the Government needs to establish strong market linkages so that the farmers sell their produce in the market. The returns available by selling the produce within the State needs to be compared with the prevailing prices in other parts of the country and a suitable strategy needs to be put in place.

CHAPTER-7

CHANGES IN SOCIO-ECONOMIC STATUS

7.1 Introduction:

Income has always been an important determinant of socio-economic status of any individual, family, community, and society alike. However, it is also an extremely difficult to make an accurate assessment of the income of individuals and also of the change in income as the respondent are always reluctant to share any information related to their income and if they do at all, it is always misleading because of inherent tendency not to divulge any information related to individual's income. It was a challenge before the team to get an idea as to have the sericulture operations have impacted lives of the farmers engaged in it. An attempt was made to assess the changes in income, which were brought after starting the sericulture operations by the farmers, by asking indirect question which, in the perception of the beneficiaries had resulted in changes in the consumption basket. The interviewers were trained to help respondents feeling comfortable and trusting the interviewers. The interviewers were trained to ask about the items of consumption which were added to consumption basket of respondents after they took up sericulture as an income supplementing activity. Addition of even a single item in the consumption basket, without any deletion was seen as important in consumption basket and accordingly they were ranked depending on the number of items added. It surely indicated to income enhancement. Increase in quality of consumption of items which already were a part of the basket was also contributed the further increase in income of respondent. The responses captured have been interpreted in the following text.

The improvement in the consumption basket was further sub categorized into improved and highly improved based on the number of items added to

the consumption. The proportion to the respondent that indicated to high improvement in consumption basket has reported just by 6.67 percent of household. Whereas, about 89 percent of the respondent were of the opinion that their consumption basket improved fairly after they took up sericulture. These finding have been taken as an indication of increase in income of the respondent by taking up sericulture operations. Table 7.1 gives sericulture Division wise observations on changes in consumption basket. The proportion of beneficiaries who reported a deterioration in consumption basket was found to be absent. The observed responses from the beneficiaries are a clear indication that sericulture has resulted in increase in income of the farmers who took up this activity.

Table No. 7.1:changes in Consumption Basket of households

(in percentage)

Sr. No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	Highly Improved	10.00	10.00	6.67	0	6.67
2	Fairly Improved	83.33	86.67	86.67	96.67	88.33
3	No Change	6.67	3.33	6.66	3.33	5.00
4	Worsened	0	0	0	0	0
Total		100	100	100	100	100

Source: Field survey

Similarly, another question that was put to the respondents was what items they spent the income generated from sericulture instead of asking directly about if it has resulted in increase in their income. This information has been used to draw inferences with regard to changes in living standards of the beneficiaries. About half of the beneficiaries were of the opinion that with the increment in income resulting from sericulture they were able to provide better education to their children. About one fourth of respondents used incremental income to construct a new house or to repair an existing house. The next items of expenditure were on getting medical facilities which was reported by 15.83 percent of household. Expenditure on luxury items and on entrainment were the least preferred items of expenditure with increment in income. Similar pattern

of preference over expenditure was observed across all Sericulture Divisions with minor variation. This can be seen from table 7.2 Hence, an inference can be drawn that sericulture has surely resulted in increase in income of the farmers, but the magnitude of this increase was not possible to be assessed due to obvious constraints.

Table No. 7.2 Improvement in Standard of Living of household (percent)

Sr. No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	Purchase more luxury items then before	3.33	13.33	6.67	0	5.83
2	Receiving more medical facilities	20.00	10.00	26.67	6.67	15.83
3	Providing better education to Children	40.00	53.33	14.66	50.00	47.50
4	Construction of new/ Repair of old House	33.33	13.34	13.33	40.00	25.00
5	Increase the entertainment expenses	3.33	10.00	6.67	3.33	5.84
Total		100	100	100	100	100

Source: Field survey

All attempt was also made to see if the beneficiaries in lifting the status of women engaged in sericulture. It has already been established that a major proportion of the farmers engaged in sericulture in Himachal Pradesh constitutes of women. It has also been inferred from the observed data that sericulture has certainly resulted in increase in income beneficiaries irrespective of gender, which, in turn, helped in lifting the status of beneficiaries.

Women beneficiaries were specifically asked to mention as to how do they feel that sericulture has help in lifting their status instead of asking directly if sericulture has raised their status. More than half of the respondents were of the opinion that they had higher social status than past sericulture operations. One third of the respondents felt economically empowered after taking up sericulture. About 13 percent of the respondent women were of the opinion that they felt empowered as now they possessed necessary skills for undertaking sericulture. Table 7.3 gives an idea of inter- Sericulture Division variations on the indicators which share few variations only.

Table No.7.3: Factor Contributing in Improvement Status of women.

(percent)

Sr. No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	Skill Up-gradation	6.67	20.00	15.79	9.09	13.33
2	Social Status	63.33	46.67	47.37	45.45	52.22
3	Economic Status	30.00	33.33	36.84	45.46	34.45
4	Political Status	0	0	0	0	0
Overall		100	100	100	100	100

Source: Field survey

The findings mentioned in this chapter indicate that sericulture, in Himachal Pradesh, has emerged as one of the most important subsidiary occupations in supplementing the income of the farmers engaged in this occupation. The increased income has helped them in providing more opportunities to choose while increasing choice over available options. Beneficiaries have been able to provide better education to their children, provide better health care to their families and were also able to construct better dwelling units. Women engaged in this occupation also felt empowered both economically and socially.

CHAPTER-8

IMPACT OF TRAINING ON KNOWLEDGE LEVEL OF SERICULTURISTS AND TRANSFER OF TECHNOLOGIES IN SERICULTURE IN STUDY AREA

7.1 Introduction:

The Knowledge and adoption of improved sericulture technologies is essential to increase the production and productivity of cocoon at its potential level. The Central Silk Board (CSB) of India has started many programmes to improve the basic infrastructure which is required for sericulture cultivation. The CSB is working with State Sericulture Department and extends its assistance to stakeholders and States Sericulture Department for raising of Kisan Nursery, plantation with improved mulberry varieties, drip irrigation, chawki rearing centers, construction of rearing houses, rearing equipment's, support for certified seed, provides free of cost training facilities to sericulturists and support for develop the reeling units like automatic reeling units and multiend reeling machine etc.

But, despite these efforts the sericulture production and productivity has not increased in Himachal Pradesh over the years. This indicates to the possibility of either the benefits of the scheme are not reaching to the cultivators or ignorance of the cultivators about the need to have this type of infrastructure to increase productivity. In this chapter, an effort has been made to assess the awareness of cultivators and also the impact of training on awareness level of Sericulturists which may have helped them to adopt improved technology in study area. The kind of assistance given to the

farmers in lahks of subsidy for purchasing of various tools and equipments helpful in the entire sericulture operation and the training provided to them have also been assessed in this chapter.

8.2. Assistance received by the beneficiaries:

The assistance given to the farmers has been divided into three parts i.e. assistance provided during pre- cocoon period, cocoon period and post cocoon period. Mulberry plants are grown and cultivated during the pre-cocoon stage of sericulture. The silkworms feed and leaves of mulberry plants. The mulberry plants are grown either from seed or from root grafting or from stem grafting. One kilograms of mulberry leaves can feed about 50 silkworms from egg stage to cocoon stage. The cocoon period refers to a stage where eggs hatched by female silkworms are fed on the chopped mulberry leaves. At maturity, the silkworm starts wrapping themselves in a cocoon. The pupae inside the cocoon are killed by boiling them in water and silk filaments are twisted into a thread during the past-cocoon stage, A sizeable proportion of beneficiaries sell cocoon in the market before twisting silk filaments into thread. This section attempts to list the kind of assistance received by the beneficiaries ranging from training, tools and implements to monetary assistance.

Table 8.1 exhibits various kinds of assistance received by farmers during pre- cocoon period, cocoon period and post cocoon period. Almost all the beneficiaries had received assistance in the form of mulberry plants, certified seeds, training and equipments used in rearing during pre-cocoon period. The pattern observed in all the sample Sericulture Division was similar, if not identical. However, only three -fourth beneficiaries could avail financial assistance in the form of subsidy. Not all beneficiaries in Nadaun Sericulture Division could avail the financial assistance and proportion of such beneficiaries was about 63 percent. It fact low coverage of beneficiaries for giving financial assistance in Nadaun Sericulture Division pulled down the overall figure for the State as a whole as well. Almost all the beneficiaries had received training during cocoon period however,only about 8 percent beneficiaries received financial assistance in the form of subsidy during cocoon period. Similar observations were

made across all the Sericulture Divisions. Despite almost universal coverage of beneficiaries for training during cocoon and pre-cocoon period, post-cocoon period training did not find preference with the beneficiaries as only about 37 percent of the beneficiaries did receive post-cocoon period training. The executing agency needs to look into the reasons for law coverage of beneficiaries for providing subsidy to them. It needs to identify if it is because of lack of awareness or ineligibility of the beneficiaries that has resulted in such a small coverage of beneficiaries.

8.3. Training provided by sericulture Department to beneficiaries:

Sericulture farming is a technical occupation which require skill. Therefore, for increasing need to upgrade their skills with each advancement in technology. Following are required to be taken into consideration for better outcome:

- Training of the entire family including children is very crucial as it is a family enterprise.
- Training of technicians who help farmers in the establishment of farm and who can function as a trainer for providing training.
- Exposure visits and demonstrations are found to be very effective and useful method of training.
- Decentralized training arrangements should be made to make training more universal.

Table No. 8.1: Assistance received by beneficiaries from the concerned Department

Sr. No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	**Pre- Cocoon Period**					
a	Mulberry Plant	100	100	96.67	100	99.17
b	Certified Seed	96.67	100	100	100	99.17
c	Training	96.67	96.67	96.67	100	97.50
d	Equipments for rearing Shed	96.67	86.67	90.00	100	93.33
e	Subsidy (Monetary)	90.00	80.00	36.67	100	76.67
2	**Cocoon Period**					
a	Training	93.33	100	93.33	100	96.6
b	Subsidy (Monetary)	6.67	16.67	3.33	3.33	7.50
3	**Post- Cocoon Period**					
a	Training	43.33	36.67	20.00	46.67	36.67

The beneficiaries were asked questions about the training having been received by them both -on-field and off-field. They were also asked if the training provided to them was beneficia; for them in making sericulture a successful operation. Almost all the beneficiaries received training from the Government agencies and received both on-field and off-field training. The beneficiaries were unanimously in agreement with the idea that the training provided to them by the Government had helped them in making their venture into sericulture a success. This clearly indicates that the State Government's efforts in planning and imparting training to sericulture farmers have been a great success in as far as training coverage of farmers was concerned. After making an assessment if the farmers were provided training by the Government agencies, an attempt was also made to determine if the knowledge imparted to the farmers was actually used by them while performing various sericulture operations. They were asked simple questions about some of the technologies and tools and implements which are used in sericulture and if they were using them. Use of such technologies and implements by the respondents has been used to know the effectiveness of training imparted to them by the Government agencies.

Table No. 8.2: Detail of Training Provided by Department to Beneficiaries in study Area

S. No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	**Whether the Deptt. Has imparted Training**					
a	Yes	96.67	96.67	100	93.33	96.67
b	No	3.33	3.3	0	6.67	3.33
2	**Method of Training**					
a	On Field	93.33	93.3	96.67	90.00	93.33
b	Off Field	96.67	96.67	100	96.67	97.50
c	Both	96.67	96.67	100	93.33	96.67
3	**Whether Training Beneficial**					
a	Yes	96.67	96.67	100	93.33	96.67
b	No	3.33	3.33	0	6.67	3.33

Source: Field survey

8.4 Effectiveness of knowledge imparted through trainings:

If a respondent was found to be using a particular technology/ tool or implement, it was construed that the respondent was trained, and the training imparted was effective in persuading the respondent to use that technology tool or implement and response was rated as "Fully Effective". If a respondent was aware of the need to use the technology tool or implements, the response was rated as "Partially Effective". Similarly, if the respondent was not convinced if she/he should be using a particular technology, tool or implement, the response rated as "Not Effective". The respondents were asked these questions pertaining to use of 13 main technologies/ tools and implements commonly used in sericulture. The following text is an attempt to assess the effectiveness of training in persuading the farmer to use these technologies/ tools and implements.

i) New Mulberry Plantation: Quality new mulberry leaf as an initial input for silk cocoons is the key to increase productivity of sericulture. However, only about 7 percent of the respondents confirmed that they were actually using latest varieties of the mulberry leaf for feeding silkworms. About 92 percent of the respondent had the knowledge of the importance of feeding silkworms on new mulberry leafs but were not using the latest varieties of mulberry plants. Only one percent of the

respondents were not convinced about using latest varieties of mulberry plants for feeding silkworms. All the four Sericulture Divisions exhibited a similar pattern. If farmers start using new varieties of mulberry plants, there is a scope in improvement in productivity of sericulture.

ii) Drip Irrigation: Drip irrigation system is helpful in achieving optimal water use with high efficiency in water use and can result in optimum output. Unfortunately, only one of the respondents out of 120 sample respondents had knowledge about benefits of using drip irrigation and none of them were found to be using drip irrigation system as they did not appear to be convinced about its use in sericulture. Convincing farmers and assisting them through convergence with other schemes like PMKSY and others needs to be a priority with the extension steps to optimize water use efficiency and output.

iii) A Separate Rearing House: ideally, a separate rearing hall with an ante room and a leave preservation room is recommended for successfully keeping and feeding the silkworms. However, only very few respondents had constructed a separate rearing house with the specifications which were prescribed during the training. About 73 percent of the respondents had rearing house either with house or had a separate rearing house which did not meet the specifications prescribed by the training agency. About 17 percent of the respondents were not aware about the importance of having separate rearing house.

iv) Mounting Hall: Fully fed larvae became translucent and start crawling. At this stage, they are shifted to montages to help larvae to spinning to silk forming cocoons. The silkworms urinate just before spinning that result in high humidity and foul smell. Hence, a well ventilated separate mounting hall is recommended for sericulture operations. 31 percent of the respondents did not feel the need to larvae a separate mounting hall and 64 percent of them did understand the need to larvae a separate mounting hall, yet they were using montages within the rearing hall without being able to give any reason for doing so. Only 5 percent farmers were using a separate and ventilated mounting hall.

v) Montages: Since use of montages is directly related to use of a mounting hall by the farmers, similar proportion of families were found to be using montage as were using a separate mounting hall.

vi) Rearing Appliance: Sprinkler, power, sprayers, hygrometer, humidifiers etc. are some of the appliances and tools used in silkworm rearing. Only 10 percent of the farmers were using these appliances in the survey area with the maximum percentage of the farmers using appliances in Dehra sericulture Division. However, no farmer was found to be using rearing appliances in Mandi Sericulture Division. The proportion of farmers who were ignorant of the use of rearing appliances was very little.

vii) Trenching and Mulching: The mulberry leaf yield can be easily enhanced if appropriate trenching and mulching practices are followed by the farmers. About 19 percent of the farmers were actually following the trenching and mulching practices which were advocated to them during training sessions. A considerable proportion of 78 percent of farmers were not following the practices shared with them during training and only 2.5 percent of the respondent were not aware of the practices prescribed through the existence staff and trainings.

Table No. 8.3: The Extent of Knowledge and adoption of Technology by Sericulture farming beneficiaries in Study Area

Sr.No.	Particulars	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	**New Mulberry Plantation**					
a	Fully effective	6.67	10.00	3.3	6.67	6.67
b	Partially effective	93.33	90.00	93.33	93.33	92.5
c	Not Effective	0	0	3.34	0	0.83
2	**Drip Irrigation**					
a	Fully effective	0	0	0	0	0
b	Partially effective	0	0	3.33	0	0.83
d	Not Effective	100	100	100	100	100
3	**Rearing House**					
a	Fully effective	20.00	16.67	0	3.33	10.00
b	Partially effective	80.00	83.33	36.67	93.33	73.33
c	Not Effective	0	0	63.33	3.34	16.67

4	**Mounting Hall**					
a	Fully effective	16.67	0	0	3.33	5.00
b	Partially effective	73.33	80.00	30.00	73.33	64.17
c	Not Effective	10.00	20.00	70.00	23.34	30.83
5	**Trenching & Mulching**					
a	Fully effective	36.67	20.00	10.00	10.00	19.17
b	Partially effective	60.00	76.67	86.67	90.00	78.33
c	Not Effective	3.33	3.33	3.33	0	2.50
6	**Rearing Appliances**					
a	Fully effective	23.33	10.00	6.67	0	10.00
b	Partially effective	76.67	90.00	86.67	100	88.33
c	Not Effective	0	0	6.66	0	1.67
7	**Bio- Fertilizer**					
a	Fully effective	13.33	13.33	20.00	13.33	25.00
b	Partially effective	11.67	83.33	80.00	83.33	73.33
c	Not Effective	0	3.34	0	3.34	1.67
8	**Mountages**					
a	Fully effective	13.33	0	3.33	0	4.17
b	Partially effective	66.67	73.33	46.67	63.33	62.50
c	Not Effective	20.00	26.67	50.00	36.67	33.33
9	**Mechanization**					
a	Fully effective	10.00	3.33	3.33	0	4.17
b	Partially effective	70.00	83.33	30.00	53.33	59.16
c	Not Effective	20.00	13.34	66.67	46.67	36.67
10	**Kisan Nursery**					
a	Fully effective	6.67	3.33	6.67	6.67	5.83

i) Bio-fertilizer: Use of certain bio-fertilizers is prescribed during the training for the beneficial nutrition of mulberry. 25 percent of the respondent were found to be using prescribed bio-fertilizers whereas 73 percent of them were not using prescribed fertilizers despite having knowledge about them. The highest proportion of farmers who were using prescribed bio-fertilizers was in Dehra Sericulture Division. About 2 percent of the farmers were found unaware about the need to use bio-fertilizer in sericulture.

ii) Mechanization: The mechanization of various process like mulberry cultivation, silkworm rearing and seed production despite housing having heavy initial cost certainly helps in cutting down subsequent costs and improving quality of produce. Only about 4 percent of the farmers were using machine in these processes with the highest

proportion of farmers using machines again being in Dehra at 10 percent. However, 37 percent of respondents were not even aware of the need to use machines in sericulture.

iii) Kisan Nursery: Sericulture farmers are educated and advised to procure mulberry planting material from the certified and identified Kisan nurseries. Quality planting material would help in increasing leaf yield of good quality resulting in good cocoon production. Only about 6 percent farmers were found to be procuring planting material from nurseries. 24 percent of farmers know about nurseries but were not procuring planting material from nurseries. Farmers from Mandi Sericulture Division had the largest proportion of farmers who were procuring planting material from kisan nurseries.

iv) Seri-poly clinic: The services provided by the Seri-polyclinics help in management of silkworm disease, explore and provide anti-bacterial protein to prevent disease, diagnosis of disease and monitoring the disease area etc. Timely services by the polyclinics can prevent distastes for the farmers in the eventuality of an infection. Only 3 percent of the farmers were using the services provided by the polyclinics and about 78 percent of the farmers were not even aware of the services being provided by polyclinics. 19 percent of farmers were not availing these services inspite of possessing knowledge about them.

Above analysis clearly indicates that only a very small proportion of the farmers in Himachal Pradesh are following the prescribed use of technologies tools and implements through the training provided to them Still a small proportion of farmers did not have the knowledge about these technologies, tools and implements. However, a worrying fact that came into notice during the field survey was that a considerable section of farmers was not using prescribed technologies, tools and implements. The extension staff needs to motivate and convince this section of farmersto follow prescriptions made during the trainings.

CHAPTER-9

PROBLEMS, SUGGESTIONS/PROPOSED POLICY MEASURES

9.1. Introduction:

Sericulture farming has alot of potential to create employment and can help in the sustenance of weaker sections of the society while improving their socio- economic status. However, due to certain constraints, i.e., financial, technical, mechanical and administrative; sericulturists are not able to increase their production. An attempt was made during the field survey to list the problems being faced by the farmers engaged in sericulture in Himachal Pradesh as identified by them. They were asked question about pre-identified issues and were also requested totell about the problems other than the questions which were asked from them. This section highlights the problems being faced by the sericulturists in the State based on their feedback.

9.2. Constraints in cocoon production:

i) **Mulberry plants and water scarcity:** Infected roots and scarcity of water are main hurdles in production of quality mulberry leaf. Overall 87.50 percent farmers reported that the root stock of mulberry plantation supplied by sericulture Department was good while 15 farmers stated that root stock provided to them was infected that could not survived. In case of water scarcity 80.83 percent farmers reported that there was scarcity of water for irrigation and the mulberry plants planted by them hardly survived or survival rate of plantation were very low. Further, it also came

out during the survey that most of the farmers did not have their own mulberry plantation and had to rely on unmaintained mulberry trees on the road side and bunds for which were of inferior quality leaves.

ii) Seeds: Inadequate supply of seed and poor-quality silkworm seed may affect sericulture production adversely. 16.67 percent farmers of Mandi division and 13.33 percent of Ghumarwin division reported inadequate availability of seeds while 23.33 and 13.33 percent farmers of Mandi and Dehra divisions respectively reported the non-availability of certified seeds which affected sericulture production adversely.

iii) Rearing house: Most of the farmers of Nadaun division mainly pertaining to General category claimed that they never got any subsidy to construct separate rearing house from Government.It results in very few farmers having a separate rearing house. The overall proportion of sampled farmers using the separate rearing house was also not high as they were using the small part of residential house for silkworm rearing.

iv) Poor adoption of new technology and poor extension support: The rearing infrastructure, space and appliances available with the farmers need to be re-engineered especially, for those farmers who did not have adequate rearing space and essential appliances required for rearing. Further, farmers not only need to be trained and demonstrated about the latest methods of silkworm rearing but also be seen that the knowledge acquired by the farmers during training is actually put to use by them. Most of the respondents were of the opinion that the extension staff was rarely available for post training follow-up to see that the prescribed methods are actually adopted.

Table No. 8.1: Problems faced/ reported by Seri-culturist in Study Area (Percent)

Sr. No.	Problems faced by Seri culturists	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
1	**Mulberry Plants**					
1.1	**Infected Roots**					
a	Yes	16.67	0	10.00	23.33	12.50
b	No	83.33	100	90.00	76.67	87.50
1.2	**The water Scarcity**					
a	Yes	33.33	73.33	66.67	83.33	80.83
b	No	66.67	26.67	33.33	16.67	19.17
2	**Seeds**					
2.1	**Inadequate Seeds**					
a	Yes	6.67	13.33	6.67	16.67	10.83
b	No	93.33	86.67	93.33	83.33	89.17
2.2	**Non availability of certified Seeds**					
a	yes	13.33	10.00	10.00	23.33	14.17
b	No	86.67	90.00	90.00	76.67	85.83
3	**Rearing House Ownership**					
a	Yes	93.33	90.00	36.67	100	80.00
b	No	6.67	10.00	63.33	0	20.00
4	**Miscellaneous Problems**					
4.1	**Stray Cattle and Monkey Menace**					
a	Yes	73.33	83.33	86.67	83.33	81.67
b	No	26.67	16.67	13.33	16.67	18.33
4.2	**Non-Remunerative Price**					
a	Yes	16.67	16.67	33.33	16.67	20.83
b	No	83.33	83.33	66.67	83.33	79.17
4.3	**Inadequate Mulberry Leaves**					
a	Yes	13.33	20.00	33.33	33.33	25.00
b	No	86.67	80.00	66.67	66.67	75.00
4.4	**Unfavorable Climate (prolonged rainy Season)**					
a	Yes	93.33	100	100	96.67	97.50
b	No	6.67	0	0	3.33	2.50
4.5	**Damage caused by Rats Lizard, Birds and other Insects**					
a	Yes	90.00	83.33	90.00	90.00	88.33
b	No	10.00	16.67	10.00	10.00	11.67
4.6	**Non-Availability of nearby Market**					
a	Yes	10.00	0	3.33	6.67	5.00
b	No	90.00	100	96.67	93.33	95.00
4.7	**Deferred Payment to the farmers**					
a	Yes	10.00	0	0	6.67	4.17
b	No	90.00	100	10	93.33	95.83

Source: Field survey

v) Shortage of mulberry leaves: Now availability of adequate mulberry leaves is another hurdle which affects sericulture production adversely. 25 percent farmers reported that they had not received adequate mulberry leaves to feed the silkworm. The problem of inadequate mulberry leaves was reported by 33.33 percent of cocoon growers each in Mandi and Nadaun divisions followed by 20 percent and 13.33 percent in Ghumarwin and Dehra divisions respectively.

vi) Stray cattle and monkey menace: The newly planted mulberry plants were destroyed by stray cattle while old plants were destroyed by monkeys. This disrupted the supply of mulberry leaves.87.67 percent farmers reported that they were facing the shortage of mulberry leaves because of stray cattle and monkeys and the mulberry leaves also lost its quality because of this problem.

vii) Damage caused by Rats, Lizard, Birds and other Insects: overall 88 percent of the farmers reported that damage caused by birds' insect, rats and lizard adversely affected cocoon production.

Viii)Non- remunerative Price: The problems of non- remunerative price were reported to be one of the major problems by 33.33 percent growers in Nadaun division followed by 16.67 percent from each Dehra, Ghumarwin and Mandi divisions respectively. Overall farmers who were not happy with the prices they are about 21 percent.

ix) Unfavorable Climate (prolonged rainy Season): Overall 97.50 percent farmers reported that prolonged rainy season almost spoiled their sericulture production of autumn season. Long warm and humid spells blacken mulberry leaves resulting in the shortage for feeding silkworm which ultimately affects the quantity & quality of cocoons.

x) Non-Availability of nearby Market and Deferred Payment by Seller: The farmers were happy and satisfied with the Government's efforts to provide buying facilities near to production centers. They were also happy with the timing of payment for their produce by buyer/ Government.

9.3. Opinion regarding continuation of Government Schemes: An open-ended question was asked from the respondents if they want the Government schemes to continue in future and they were also encouraged by the investigators to state the reasons for continuation or discontinuation of the scheme. 93 percent of the farmers supported continuation of schemes as it has helped them to generate additional family income. However, they were vocal in parting out to shortcomings in the implementation mechanism and they repeated almost every problem which has been listed in the preceding text. Only 7-8 percent of farmers did not want this scheme to continue. The reason given by them was that these schemes though have helped in increasing their income, the increase in income was not adequate and they would look forward to another occupation with higher returns. These responses can be seen those programmes as a successful initiative the Government in as per as raising of farmers income is concerned.

9.3. Table No. 9.2: feed back regarding continuation of Government Schemes(percent)

Sr. No.	Particular	Division				Overall
		Dehra	Ghumarwin	Nadaun	Mandi	
A	Do You Want the Scheme Continue in Future					
1	Yes	93.33	93.33	86.67	96.67	92.50
2	No	6.67	6.67	13.33	3.33	7.50

Source: Field survey

9.4. Suggestions/recommendations

9.4.1. Timely and adequate availability of mulberry leaves:

Mulberry leaves are the main food plant of silkworms. During the rearing period, silkworm requires adequate mulberry leaves. The proper and adequate feeding has a predominant influence on the growth of silkworm and quality of cocoons. Most of the sericulturists are small and marginal farmers. These farmers do not have their own mulberry plantations. They depend on big landowners for mulberry leaves. At the time of fodder scarcity, they tend to stop the supply of mulberry leaves due to which silkworm remains underfed and does not give as much yield as it can.

Massive plantation drive encouraging farmers to grow their own mulberry is required to overcome the problem of shortage of mulberry leaves and non- availability of quality mulberry leaves as noticed in Study area, needs silkworm rearers must be encouraged and supported to raise their own mulberry plantations. Plants of popular mulberry cultivars have to be provided to the farmers at affordable cost along with new production technology. This will ensure that farmers get enough quality mulberry leaves at their doorsteps in future.

Secondly, if farmers do not have sufficient land for plantation the Government has to make a policy to encourage plantations either in the village common land or allow some plantations in the forest area. These plantations need to have common ownership rights.

9.4.2. Silkworm Rearing:

Silkworm rearing is a highly technical issue. It requires great care and hard work to preserve these worms. A suitably ventilated room is required for the silkworm rearing coupled with required proper appliances. Therefore, rearing infrastructure, space and appliances available with the farmers need to be provided especially to those rearing families who don't have these facilities and are not in a position to create required facilities out of their own resources. State Government has to help these families in providing tested low-cost technologies like rearing huts, montages and cocoon dryers etc. for improving produce better of small and marginal farmers.

Secondly, the farmers not only have to be trained and demonstrated with respect to improved method of silkworm rearing subsequently it also needs to be ensured that they adopt sericulture farming as an income augmenting and employment generating venture with the learnt techniques. This will help the farmers to go for silkworm rearing and mulberry cultivation as per the scientific protocol.

It was also reported that the extension staff do not make regular and timely visits to rearing centers to provide required technical advice to the rearers. This may be because of existence of vacant posts of extension staff. The

reach of extension staff needs to be strengthened by looking into its absence.

9.4.3. Credit facilities:

Most of the farmers engaged in sericulture farming are marginal and small with limited financial resources. They require adequate capital to carry various sericulture activities. The assistance being providing by sericulture department in the form of subsidies is not sufficient as their economic status is not good and they are not able to invest even small money from their own pocket. Further, silkworm insurance was found to be absent in the State. This is one of the important reasons that sericulture is not growing to its potential. Therefore, rearers have to be provided long term as well as short term loans for mulberry plantation, construction of rearing hall and for purchasing of rearing equipments. Insurance of silkworm distributed to rearers is also required to ensure assured returns.

Secondly, women sericulturists often discouraged to extend credit facilities by the bank as the title of land is not in their name. This practicable aspect needs to be looked into.

9.4.4. Better Price:

Although most of the farmers were happy with the price they were getting, slow movement in prices over the last 20 years is not a good sign. The movement of prices during this period shows that movement has not been adjusted for inflation. The departmental mechanism of procurement ensures procurement at door- steps of farmers. However, the prices for cocoons appear to have stagnated. A mechanism is required to be in place where either the farmers get better prices, or some value addition chain is established to ensure better remuneration to the sericulturists in Himachal Pradesh.

Secondly, delay in collection and purchasing of cocoons may cause huge loss of farmers as cocoons tend to perish if not supplied in time for silk reeling units. Therefore, Government also has to work to tie up with textiles industry in and out-side of the state so that farmers get appropriate returns of their produce.

9.4.5. Post cocoon period assistance:

Most of the Government schemes assist farmers in rearing silkworms, cocoon production and selling of cocoons only. A comprehensive package for post cocoon activities needs to be evolved. Improved cocoon drying and reeling equipments need to be encouraged for better returns.

9.4.6. Seri waste:

Seri-waste can be used for animal feed which is a good source of protein. Animal feed prepared from Seri- waste can help in fetching good return to the farmers. Mulberry silkworm pupae are well-known by- products which are used for feeding of poultry and trout fish. Providing linkages with these areas will surely help them in augmentation of their income.

9.4.7. Introduction of sericulture in unrepresented areas:

Under the changing global climatic scenario expansion of mulberry plantation/sericulture farming to the new and unexplored area assumes a greater significance as it will prove to be a source of sustainable livelihood for the poor.

CHAPTER-10

SWOT ANALYSIS

SWOT analysis is a tool that helps organization/ Department/sector to build a strategic plan to meet certain set of objectives and goals. It's an organized approach that identifies strengths, weaknesses, opportunities and threats of organization/ department / sector. It helps the organization to identify the ways to improve efficiency and productivity. A two-by-two matrix is used to build a SWOT analysis, which determines whether objectives, production, quality and goals are strategic fits or not? The best strategic fits are when the internal factors (strengths and weaknesses) align with the external environment (opportunities and threats). The strengths, weaknesses, opportunities and threats for the silk farming of state are given below in table 10.1.

SWOT Analysis of Himachal Pradesh silk Industry:

9.1: Strengths:

- Agro-based labour-intensive cottage industry with low capital investment & good returns.
- Small gestation period.
- Mulberry plants can be grown on all type of soil including waste land.
- Women friendly occupation, where involvement of women are more than 75% work force are from women folk.
- Ideal Programme for weaker sections of society.

- Eco- friendly venture with immense utility in afforestation of land and anti-soil erosion programme
- High employment potential.
- Input/ equipment support to sericulturists through various programmes of Centre/ State Government.
- Support to sericulturists for construction of separate rearing house.
- Supply of high yielding planting material and silkworm seed at subsidized rate.
- Availability of structured training programmes & exposure visits and providing marketing and institutional support.

9.2: Weaknesses:

- Season specific silkworm rearing, cocoon can be produced only in two seasons in a year.
- Small land holding and poor socio- economic condition of most of the farmers involved in sericulture farming.
- Prolonged rainy season affects the production adversely.
- Gap in technology transfer and extension support.
- Unstable cocoon price and frequent price fluctuations.
- Lack of awareness among farmers regarding the optimum use of technology.
- Poor linkage with other sectors.
- Lack of awareness about use of Seri- waste for making by- products.
- Post cocoon sector i.e., silk reeling, spinning is underdeveloped.
- Inadequate extension services shortage.

9.3: Opportunities:

- Huge potential to create more employment.

- Sericulture Keeps rural population employed in villages and thus checks their migration to towns.
- Continuation of Government subsidy programmes is good for future perspective of sericulture farming.
- Scope of value addition and product diversification.
- In new areas, sericulture introduced with latest technology which reduced total labour input.
- Tasar silk is underutilized while demand is high for tasar silk products.
- Continuing the efforts to modernize and mechanize the post cocoon sector.
- There is space for the introduction of large reelers and establishment of power loom-based industries.
- Documentation and dissemination of innovations enable farmers to adopt the technology at wider/ large scale.
- Adoption of family training approach to make training more practical/ universal.

9.4: Threats:

- Less availability of well-trained/ skilled labour force.
- Low productivity compared to other big silk producer States of India.
- Less use/no use of modern technology.
- Scant irrigation facilities.
- Extreme climatic condition in specific regions and seasons.
- Competition faced by reelers as product process is very well defined in other States.
- Demand of silk products within the state is very low.
- Weak reeling infrastructure in state and availability of skilled reeling workforce are also very low.

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Annexure-A

Schedule For Evaluation Study on Development of Sericulture in Himachal Pradesh

Separate sheet for personal information

Name, Age, Category and Address of the beneficiary:-

a. Name ……
b. Sex **Male** **Female**

b. Age ……

c. category (Gen/SC/ST/OBC) ……

d. Village ……

e. Gram Panchyat ……

f. Development Block ……

g. Tehsil ……

h. District ……

Schedule For Evaluation Study on Development of Sericulture in Himachal Pradesh

(For sericulture Beneficiaries)

I) From where you got information about the scheme: Please (√)

Departmental Publicity (Print)	Friends/Relatives □	By visiting the department □
Web □	Electronic Media □	Other Print Media □

II) Household Land Holding (in Bighas)

Total Land Holding	Land holding under Sericulture

III) Mulberry plants detail:

How many mulberry plants provided by the department	Mulberry plants			Average distance between the adjacent mulberry plants (In feet)	Experience in Sericulture (years)
	No. of Trees planted	No. of trees survived	Land Used (In Bighas)		

IV) Rearing house:

Is Rearing House separately constructed		Total construction cost (in Rs.)	Own investment, if any (in Rs.)	Subsidy provided by the department (in Rs.)
Yes	No			

V) Equipment details: Please (√)

Net	Heater	Disinfectant	Tray	Total no. of Stands		Seeds received (In Oz)	Any other(please mention)
				Wooden	Iron		

VI) Production details:Please (√)

Cocoon Production after completion of 1st year of setting up of unit (In kg)		Cocoon Pro duction at end of 2018-19 (In kg)		Cocoon Price at Ist year of production. (In Rs. per Kg)		Cocoon Price in 2018-19. (In Rs. per Kg)	
In Spring	In Autumn	In Spring	In Autumn	In Spring	In Autumn	In Spring	In Autumn

VII) Employment Information of sericulture beneficiary

No. of persons got employment				**Mandays generated**	
At the end of 1st year of operation of sericulture farming		At the end of 2019-20		At the end of 1st year of operation of sericulture farming	At the end of 2019-20
Male	Female	Male	Female		

(VIII) Income and Employment Information of Household (s)

Sr. No.	Item	Initial Stage of Household farming Sericulture (1st year)	Present position of Household(2019-20)
1.	Gross household income with sericulture (Rs. Per/hec./household annual)		
1 (a)	Gross income from sericulture (Rs. Per/hec./household annual)		
1(b)	Gross income from other sources (Rs. Per/hec./household annual)		
2.	Total Employment Generated including sericulture (Mandays/Annual)		
2(a)	Employment genera ted from sericulture farming (Mandays/Annual)		
2(b)	Employment generated from other sources (Mandays/Annual)		

(IX) Shift in consumption pattern because of additional income generated from Sericulture/ change in standard of living of sericulture beneficiaries.

1. **(A)** Highly Improved (B) Fairly Improved (C) No Change(D) Worsened
2. Concrete Items indicating an improvement in the standard of living:
   - (A) Purchase more/luxury items then before
   - (B) Receiving more medical services
   - (C) Providing of better education to their children
   - (D) construction of new housing/ repair of old house
   - (E) Increase the Entertainment expenses.
3. Factors contributing in improvement of Women Social Status
   - (A) Skill up-gradation (B) Social Status
   - (C) Economic Status (D) Political Status

(X) Cocoon selling:Please (√)

To Government	In open Market	Both

(XI) What type of assistance do you get from the Department:- Please (√)

Precocoon period							
Mulberry Plants	Certified Seeds	Training	Equipments for rearing shed	Subsidy (Monetary)	Any other (Please mention)		

Cocoon period					Post cocoon period				
Training	Subsidy (Monetary)	Any other			Training	Subsidy (Monetary)	Any other		

(XII) Training

Whether the department has imparted training		Method of training			Whether training beneficial	
Yes	No	On field	Off field	Both	Yes	No

Suggestion for improvement in Training.....
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(XIII) Technological Intervention

Sr. No.	Items	Extent of Knowledge		
		Full	Partial	Nil
1.	New Mulberry Plantation			
2.	Drip Irrigation			
3.	Rearing House			
4.	Mounting Hall			
5.	Trenching & Mulching			
6.	Rearing appliances			
7.	Bio-fertilizer			
8.	Montages			
9.	Mechanization			
10.	Kisan Nursery			
11.	Seri Polly Clinic			
12.	Bio Production Unit			
13.	Chawki Rearing Centre			

(XIV) Problems faced by the beneficiary regarding: Please (√)

Sr. No.	Items	Response of beneficiaries	
		Yes	No
1.	(a) Mulberry Plants		
	(i) Infected roots		
	(ii) The Water Scarcity		
	(iii) Any Other		
2.	(b) Seeds		
	(i) Inadequate Seed		
	(ii) Non-availability of Certified Seeds		
	(iii) Any Other		
3.	(c) Rearing House		
	(i) Own Land		
	(ii) Rented Land		
	(iii) Any Other		

4.	(d) Other Miscellaneous Problems		
	(i) Stray Cattle and monkey menace		
	(ii) Non-Remunerative Price		
	(iii) In Adequate Mulberry Leaves		
	(iv) Unfavourable Climate (Prolonged raining session)		
	(v) Lake of Awareness in rearing silk worms seed and Raising Mulberry Plants		
	(vi) Damage caused by Rates lizard and birds and other insect during storage and drying		
	(vii) Non-Availability of nearby market		
	(viii) Deferred payment by seller		

(XV) Do you want the scheme to continue in future Yes No
if no, reasons thereof

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(XVI) Suggestion of the beneficiary for improving the programme

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Name of the investigator .....
Date of inquiry .....

(XVII) Supervisor's observation/report

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Name of the supervisor.....
Date of visit .....
Discrepancy observed/report .....

PLANNING DEPARTMENT

Yojana Bhawan, H.P. Secretariat, Shimla-2