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Impact of *Covid-19* On the global silk industry & The way forward

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***International Sericultural Commission (ISC), Bangalore, India**,*
Institutionalised in 1960, is the only intergovernmental organization engaged in the development of sericulture and silk industry across the globe.

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Preface

The Covid - 19 pandemic is the defining global health crisis since World War Two. It is much more than a health crisis, it's also an unprecedented socio-economic crisis. The pandemic led to many challenges such as life loss, threatening livelihoods, restricting the movement of people and goods, disrupting supply chains, increasing unemployment, eroding demand and production capacities and withering liquidity, thereby impacting the economy. The International Labour Organization estimates that 400 million jobs could be lost as a fallout of the pandemic. The World Bank projects US$110 billion decline in remittances this year, which could mean 800 million people will not be able to meet their basic needs. According to the United Nations Conference on Trade and Development (2020), the global economy shrank by 4.3% in 2020.

The Covid - 19 has seriously affected the existing modus operandi of sericulture and silk industry. Unfortunately, the innate advantages of silk industry has effectively become its weakness thereby creating cascading effect in job loss, losing livelihood earnings, export earnings, etc. All enterprises in both the upstream and downstream operations in silk industry across the globe have been facing serious crisis in epidemic prevention, resumption of work, getting orders and arresting the market downfalls. The pandemic has also prompted changes in the silk marketing channels and consumption patterns. About 21.50 million people associated with the industry have in one way or other affected due to the crisis.

Being the only inter-governmental organization engaged in the development of silk industry across the globe, the International Sericultural Commission felt the urgent need for studying the impact of the pandemic on the silk sector. The immediate requirement was also to evolve strategies for bringing the industry back to normalcy by restoring the supply chain activities. Resultantly, we have commissioned an impact assessment study to cover various industry partners in silk producing, processing and consuming countries. In the course of the study, we have also sourced opinion from industry experts from various sectoral areas to identify and dovetail the other prevailing problems so that a holistic strategic approach would be adopted in formulating the final recommendations.

We have decided to publish the findings and the recommendations in the form of a book for the larger benefit of the silk sector. We strongly believe that the implementation of these recommendations would facilitate the industry to recover from the present crisis and assist in taking up long term developmental plans for the sustainable growth of the silk sector. As a follow-up of this exercise, I request all of you to appraise the contents of this report to the respective authorities in your country for consideration and implementation.

On this occasion, I record my sincere thanks to Mr. Dileep Kumar, the co-author of the book, for putting earnest efforts for organizing the evaluation study and providing me the much needed insight for interpreting the study findings, which eventually resulted in formulating the recommendations. I also thank the evaluation team comprising Dr. P. Kumaresan, Scientist-D, Central Silk Board, Mr. Najunda Sastry, Assistant Director (Statistics), Central Silk Board and Mr. Padmanav Nayak, Programme Specialist, International Sericultural Commission, for their hard work in undertaking the evaluation study leading to important findings. Our sincere thanks also goes to the representatives of 20 countries and many experts, whose details are enlisted at Annexure-II, for their useful inputs for the preparation of the book. We also thank all our well-wishers for providing critical inputs during the course of preparing this document.

Thank you one and all.

Rajit Ranjan Okhandiar
Secretary General
International Sericultural Commission

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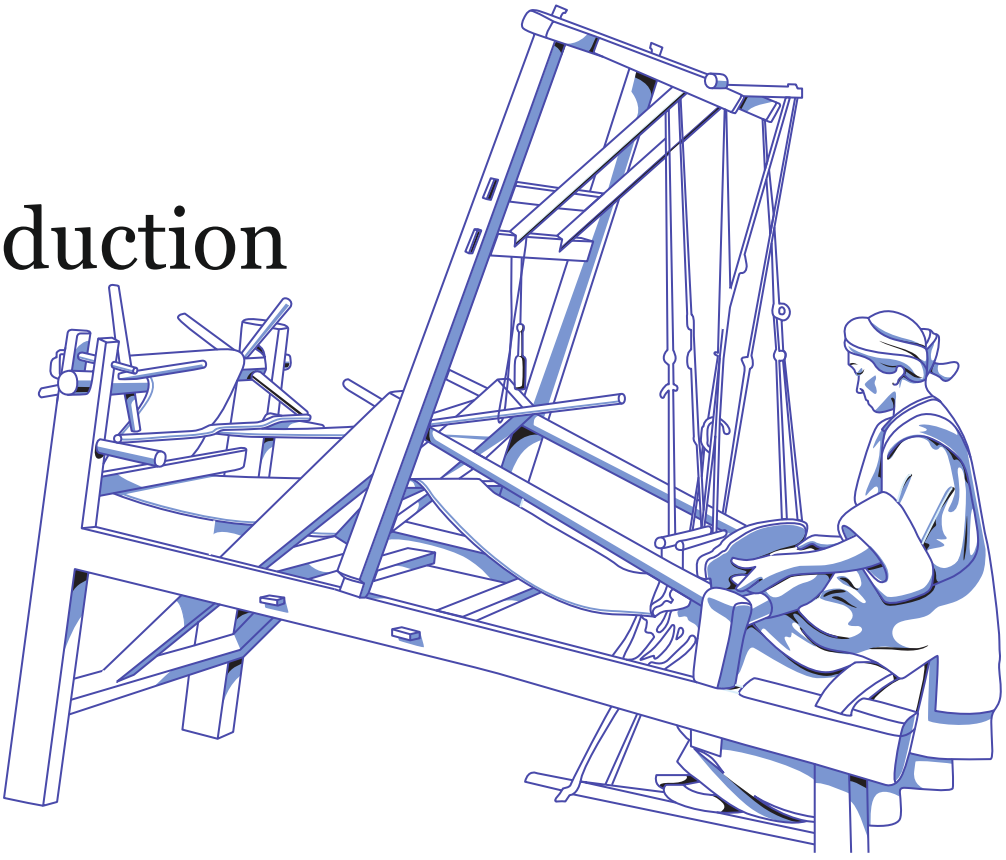
1

Introduction



The Covid - 19 pandemic is the defining global health crisis since World War Two. Since its emergence in Asia in 2019, the virus has spread to every continent even in Antarctica. The pandemic is much more than a health crisis, it's also an unprecedented socio-economic crisis. Covid - 19 pandemic has led to many challenges such as life loss, threatening livelihoods, restricting the movement of people and goods, disrupting supply chains, increasing unemployment, eroding demand and production capacities and withering liquidity, thereby impacting the economy. People have lost jobs and income and still unable to estimate when normalcy will be restored. The International Labour Organization estimates that 400 million jobs could be lost. The World Bank projects US$110 billion decline in remittances this year, which could mean 800 million people will not be able to meet their basic needs. According to the United Nations Conference on Trade and Development (2020), the global economy by shrank 4.3% in 2020[1].

Among all the textile fibers, “SILK” holds the royal lineage by origin and continue to sway its position as a fiber of intense desire and great importance in its epic journey through almost all ancient civilizations. Silk has been an important commodity of trade and commerce since its commercial exploitation under the Shang Dynastic rule from 1640 to 1160 BCE. The silk and silk products were very expensive since time immemorial due to the intricate production processes and the innumerable opportunities for value addition. It is deeply involved in the cultural and religious belief of many civilizations and hence continue to find its demand among large sections of the society. Silk is also consumed among the rich and influential people and linked with

affluence, fashion and sought-after creations by the biggest names in haute couture. On the other hand, the production bases of silk are largely located in the rural areas of developing countries and transition economies such as China, India, Uzbekistan, Brazil, Vietnam etc. Due to this demographic variation in silk production and consumption, the silk industry is credited as an ideal avocation for equity distribution among rich to poor. Silk farming being a large value chain, employs substantial number of people at each stop of the production process.

The economic recession arising out of the Covid - 19 pandemic has drastically disrupted the demand and supply conditions of all commodities across the globe. This situation has also led to sharply declining the purchasing capacity of the people. Silk, being a luxury item was not an exception to this emerging trend. The consumers usually choose the option of cancelling or postponing such luxury spending till the situation improves. These developments have seriously impacted the livelihood options of the stakeholders associated with the silk industry, who otherwise are also placed at a fragile socio-economic conditions. It is estimated that about 21.50 million people, who are getting their employment through silk industry have seriously affected due to this crisis.

A study conducted and published by International Silk Union (ISU), China, on the impact of Covid - 19 on global silk industry and consumer market trends during March 11 to April 10, 2020 indicates that the production and trade in silk have severely affected due to difficulties in capital turnover, higher labour costs, reduction in prices of silk and disruptions in supply chain. This study has addressed by and large the post-cocoon activities including trade[2].

Similarly, another study conducted by Central Silk Board, Ministry of Textiles, India on the impact of Covid - 19 pandemic on Indian silk industry revealed production decline and monetary loss at every stages of the silk value chain due to the restrictions imposed by the government[3]. The silk industry was affected with loss in production, crash in cocoon and raw silk prices, transportation issues, non-availability of skilled workers, problems in selling raw silk and silk products, working capital and cash flow problems, non-availability of raw materials, reduction in demand for silk fabric, cancellation of export/import orders besides export and import restrictions.

The Covid - 19 has seriously affected the existing modus operandi of sericulture and silk industry. The innate advantages of silk industry has effectively become its weakness thereby creating cascading effect

in job loss, losing livelihood earnings, export earnings, etc. All enterprises in both the upstream and downstream operations in silk industry across the globe have been facing serious crisis in epidemic prevention, resumption of work, getting orders and arresting the market downfalls. The pandemic has also prompted changes in the silk marketing channels and consumption patterns. At the same time, it has opened new window of opportunities which were previously less explored. The governments have introduced Standard Operating Procedures (SOP) to sustain the production process during the pandemic period. Many companies have taken steps to combine the internet and new technologies to innovate, develop, transform and upgrade to adapt to market changes for effectively fighting the economic crisis brought by the epidemic.

Although the silk industry has been affected by the Covid - 19 epidemic, the experts in the sector believe that even the current production does not meet the demand, which is consistently on an upward trajectory. The global market for silk is estimated at US$14.1 billion in 2020, is projected to reach US$22.1 billion in 2027 by growing at a CAGR of 6.6%[4]. In order to sustain the growing demand for silk, it is found necessary to commission a systematic study to assess the damages caused by Covid - 19 pandemic and formulate suitable strategies for its future development.

In this backdrop, the International Sericulture Commission (ISC), being an inter-governmental organization engaged in the global development of sericulture and silk industry has decided to take up a global study to assess the impact of Covid - 19 in the silk producing and processing countries and to develop strategic plans not only to find ways and means to tide over the immediate crisis but also to facilitate the global silk fraternity for taking up credible long term developmental plans for the sustainable growth of the industry.

1.1

Objectives of the study

The specific objectives of the study envisaged are as follows:

To analyze the impact of Covid - 19 on sericulture and silk industry at each stages of the value chain, across the nations;

To find out the strategies adopted by different countries and other agencies to mitigate the problems faced during the pandemic period; and

To prepare a broad framework of strategic plan and a stream of activities to be taken up in coordination with all related parties for the sustained global development of sericulture and silk industry with special emphasis on mitigating the fallouts on account of the Covid - 19 pandemic.

2

Methodology

The study was undertaken based on the primary information gathered from countries and industry experts across the silk producing and consuming countries. A structured questionnaire was designed and electronically provided to the silk producing and consuming countries and agencies to gather specific informations with particular reference on the attack of Covid - 19. The questionnaire used for collection of information required for the study is given at **Annexure-IA**. Besides, opinion from silk industry experts were obtained through open ended questions about the extent of problems and the strategies required to mitigate the problems is given at **Annexure-IB**. Responses were received from representatives of 20 silk producing countries and agencies and many sericulture experts from different countries. The details of the country representatives and experts participated in the study to assess the impact of Covid - 19 are provided at **Annexure-II**. The information were collected during the period from August to December 2020.

The sourced information were processed, tabulated and analyzed using descriptive statistical tools. The report along with recommendations have been prepared based on the analysis of the silk production and consumption data, response measures, expert opinions and informal consultations among the persons associated with the industry.

3 Results

3.1 *General characteristics of respondents*

The information for the study was sourced from government organizations, non-government organizations and commercial organizations from Bangladesh, Brazil, China, Cuba, Egypt, India, Iran, Italy, Japan, Kenya, Madagascar, Nigeria, Nepal, Philippines, Sudan, Switzerland, Thailand, Uganda and Viet Nam. It can be inferred from Fig. 1 that most of the (70.6%) of respondents were government organizations. 17.6% of the respondents were commercial organizations and the remaining 11.8% were non-government organizations.

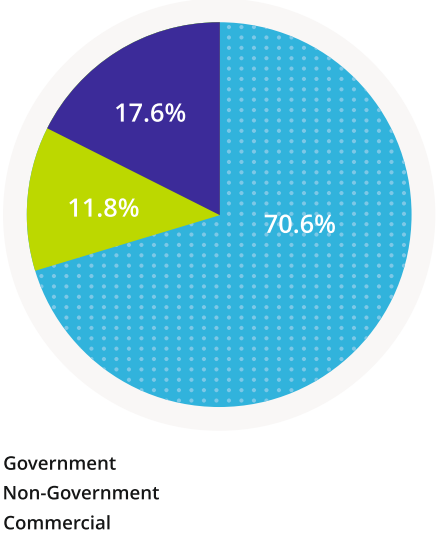
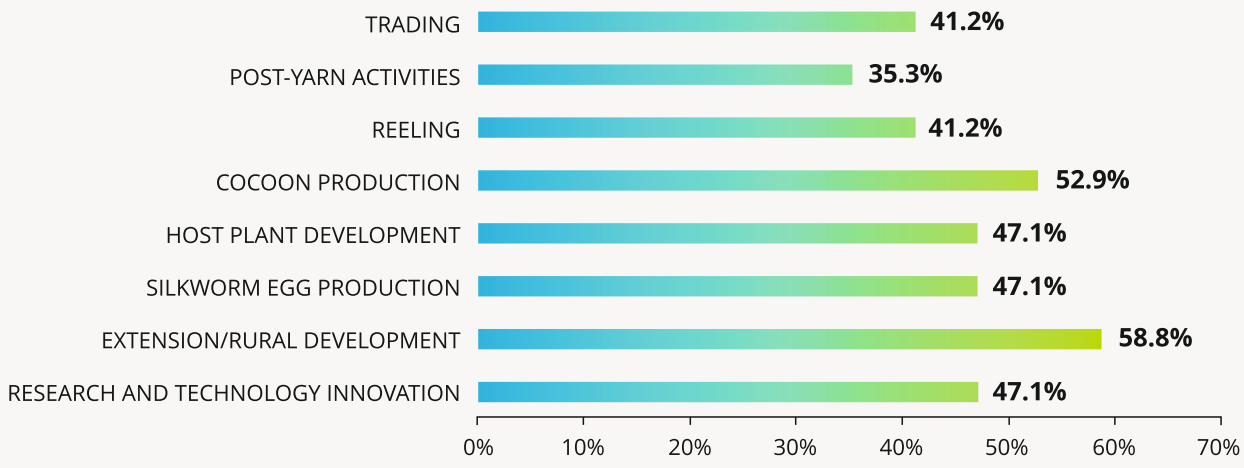


Fig. 1: Type of organizations participated in the survey

The respondents were involved in various operations as mentioned at Fig. 2. Extension and rural development was the major activity carried out by 58.8% of respondents followed by cocoon production (52.9%), research and technology innovation (47.1%), silkworm egg production (47.1%), host plant development (47.1%), trading (41.2%), reeling (41.2%) and post yarn activities (35.3% of weaving, processing etc.).



Note: As the respondents involved in more than one activity, the total is more than 100%

Fig. 2: Field of operations of respondents

Membership in international organizations would facilitate the governments and related agencies for exposure to networking, exchange of knowledge, undertake collaborative programmes, sharing of genetic resources, participate in training programmes, explore new business opportunities, product promotion, develop innovative products for the present day needs, etc. Most of the respondents (47.1%) are representatives of their country in International Sericultural Commission (ISC), 11.8% each of the respondents have membership with International Silk Union (ISU), China and Black Caspian Seas and Central Asia Silk Association (BACSA), Bulgaria. 5.9% of respondents are members in other organizations, and 23.5% of the respondents are not members of any international bodies (Fig. 3).

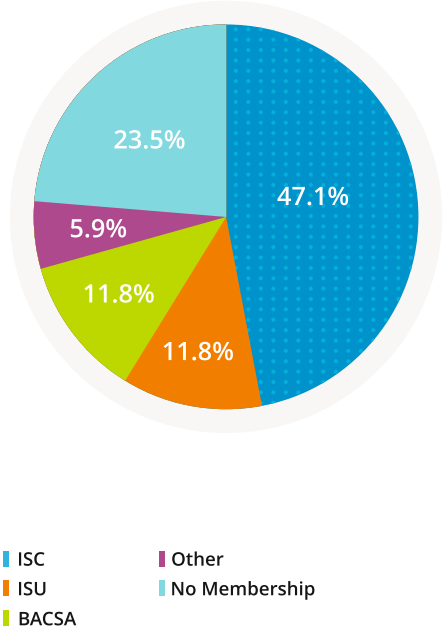


Fig. 3: Respondents' membership with international organizations

3.2

Present situation of Covid -19 in the respondents' country

About 88% of the total respondents opined that Covid -19 is still persisting in their country, whereas 12% didn't respond about the situation. Among those who have responded, majority (60%) indicated that the level of incidence was high, whereas 20% indicated that the incidence was acute and the remaining 20% felt moderate level of incidence (Fig. 4). All the respondents have opined that the economy got affected due to Covid -19 and the estimated growth rate of GDP would be negative for all the respondent countries except for China, Madagascar and Vietnam.

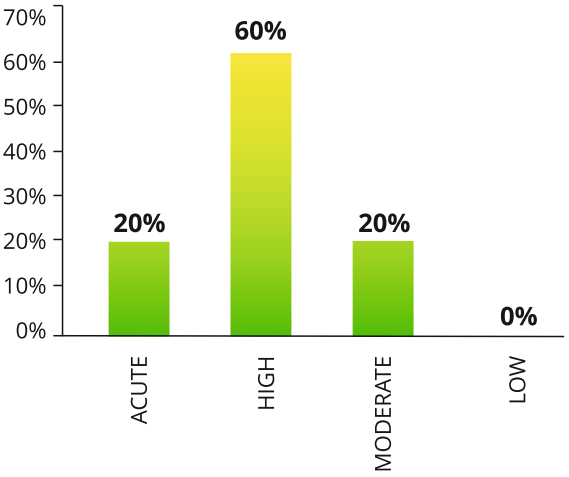


Fig. 4: Incidence of Covid - 19 during the period of survey in the respondents' country

3.3

Level of incidence of Covid - 19 in silk producing /processing areas

The extent of incidence of Covid - 19 in silk producing/processing areas at the time of survey is shown at Fig. 5. While 17.6% of respondents felt acute level of incidence persisting in the silk producing and processing areas, 23.5% each reported moderate and high level of incidence and 17.6% reported low level of incidence. Overall, 88% of the respondents opined that Covid - 19 was still persisting in silk producing/processing areas, whereas 12% of the respondents did not respond to the question.

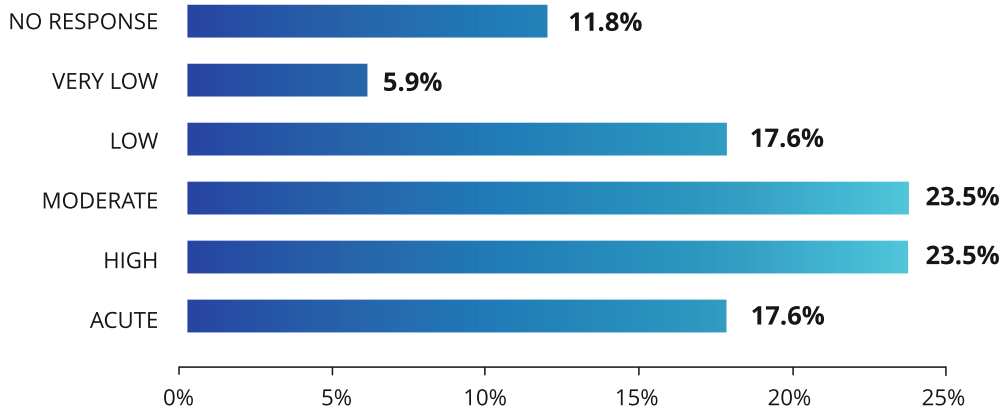


Fig. 5: Incidence of Covid - 19 during the period of survey in the silk producing or processing areas

3.4

Situation of the silk industry till September 2020 compared to the same period during 2019

All the respondents were asked to indicate level of production of raw silk and silk fabrics during first half (January to September) of 2020 (HY1) in comparison to same period in 2019 to understand the severity of the problem in each of the silk producing/processing countries. Ten respondents have provided the response for the question and the same are given at Table 1.

Table 1: Raw silk and silk fabric production during January 2020 - September 2020 in comparison to January 2019 - September 2019

EXPERT/ORGANIZATION REPORTED	COUNTRY	RAW SILK PRODUCTION (MT)			SILK FABRIC PRODUCTION		
		2019	2020	%INCREASE	2019	2020	%INCREASE
Bangladesh Sericulture Development Board	Bangladesh	0.6	0.7	19.1	-	-	-
Tongxiang Juncheng Imp&Exp Co., Ltd	China	27313	24121	-11.7	218 Million Meter	189 Million Meter	-13.4
Plant Protection Research Institute	Egypt	0.1	0.1	0.0	-	-	-
Central Silk Board	India	22788	21257	-6.7	-	-	-
Sericulture Development Centre	Iran	222	270	21.6	-	-	-
Iltalian Silk Office	Italy	-	-	-	1200mt	850mt	-29.2
Ministry of Agriculture, Forestry and Fisheries	Japan	8.2	6.9	-16.1	3442 meter	2570 meter	-25.3
International Centre of Insect Physiology and Ecology	Kenya	-	-	-	40 meter	50 meter	25.0
Jaeola Aduke Veronica	Nigeria	5.16kg	3.87kg	-25.0	-	-	-
Sericulture Research & Development Institute	Philippines	0.05	0.04	-195	547mt	261mt	-52.2

China and India are the major silk producing countries contributing 96% of the global silk output. China reported a contraction of 11.7% and India has reported 6.7% decline in raw silk production during HY1-2020 compared to HY1-2019. On the other hand, Bangladesh and Iran reported a jump of 19.1% and 21.6%, respectively, in raw silk production during 2020 compared to 2019, which can be treated as negligible due to the very low production base. China, Japan and Italy have recorded fall in silk fabric production of 13.4%, 25.3% and 29.2%, respectively during HY1-2020 compared to HY1-2019 indicating severity of adverse impact of Covid - 19 pandemic on sericulture and silk industry.

3.5

Economic loss to the industry due to Covid - 19

It can be inferred from Fig. 6 that 41.2% of the respondents reported an economic loss of 20-40% owing to the situation aroused by Covid - 19 pandemic. While 5.9% of the respondents didn't experience any economic loss, 23.5% indicated a loss of less than 10%.

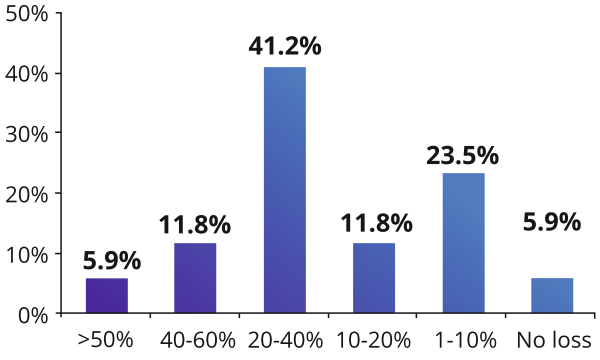


Fig. 6: Economic loss in production due to Covid - 19 pandemic

3.6

Major problems faced due to Covid - 19 pandemic

The silk industry is bisected with a long value chain of intricate components like; silkworm egg production, mulberry cultivation, silkworm rearing, silk reeling, twisting, processing, weaving, apparel production and trading. Each of these components are distinct and are closely interlinked for production processes and determine the productivity and quality of the end product. Therefore, all the respondents were asked to rank constraints on these indicated activities. The ranks assigned to each of these items were converted to homogenous scaling index by using Garret ranking technique[5] to arrange constraints sequentially in the ascending order.

3.6.1

Silkworm egg production

Healthy silkworm egg is the backbone of sericulture industry and therefore act as the sheet anchor for the production of uniform quality cocoons with high productivity and quality. It can be inferred from Table 2 that 'Production of commercial silkworm eggs' was the foremost problem during the pandemic period. 'Decrease in demand for silkworm eggs', 'Problems in distribution of eggs' and 'Generation of seed cocoons' were the other problems faced during the pandemic period.

Table 2: Constraints in silkworm egg production due to Covid-19 pandemic

Constraints	Total Score
Production of commercial silkworm egg	68.0
Decrease in demand for silkworm eggs	64.6
Problems in supply of silkworm eggs	58.8
Problems in generation of parent seed cocoon	53.0
Problems in procurement of parent seed cocoon	52.6

3.6.2

Cocoon production

Cocoon is the raw material for production of raw silk. Cocoon production is an on-farm activity carried out at farmer's level. Among the problems occurred in cocoon production, 'Non-availability of silkworm eggs' ranked first followed by 'Non-availability of other farm and rearing inputs', 'Non-availability of transportation facilities', 'Crash in cocoon prices', 'Closure of market' and 'Non-availability of workers' (Table 3).

Table 3: Constraints in cocoon production due to Covid - 19 pandemic

Constraints	Total Score
Non-availability of silkworm egg	65.2
Non-availability of farm and rearing inputs	60.5
Non-availability transportation facilities	56.7
Crash in cocoon prices	55.4
Closure of market	51.3
Non-availability of workers	50.6

3.6.3

Silk reeling

Silk reeling is an important component in silk value chain that converts the agricultural produce, the cocoons, into an industrial product, yarn with the help of machineries devised for the purpose. 'Not able to sell the silk produced' was the major problem encountered by the reeling units during the pandemic period followed by 'Crash in raw silk prices', 'Non-availability of cocoons', 'Government order to close the units' and 'Non-availability of workers' (Table 4). 'Supply chain issues' and 'Çash flow problems' were other major problems faced during the pandemic period.

Table 5: Constraints in conducting silk weaving and processing activities due to Covid - 19 pandemic

Constraints	Total Score
Not able to sell the silk produced	72.2
Crash in prices of raw silk	62.7
Non-availability of cocoons	60.0
Government order to close units	60.0
Non-availability of workers	57.4
Supply chain issues	57.4
Cash flow problems	57.3
Working capital problem	45.0

3.6.4

Silk weaving and processing

Silk weaving and processing are the important activities in the post yarn sector leading to production of final products. It can be observed from Table 5 that 'Reduction in demand' was the foremost problem encountered by the silk weavers. 'Supply chain issues', 'Non-availability of silk yarn', 'Order cancellation', 'Capital turnover constraint', 'Delay in payments', and 'Increase in labour cost' were the other major problems faced in silk weaving and processing operations during Covid - 19 pandemic.

Table 5: Constraints in conducting silk weaving and processing activities due to Covid - 19 pandemic

Constraints	Total Score
Reduction in demand	68.8
Supply chain issues	66.7
Non-availability of silk	64.0
Order cancellation	63.4
Capital turnover constraint	53.8
Delay in payments	52.5
Increase in labour cost	46.8

3.6.5

Trade

Trade is considered as a critical component facilitating uninterrupted supply of silk commodities among the participants of the value chain and finally reaching the end product to the consumers. 'Reduction in demand' is ranked as the foremost constraint faced in silk trading followed by 'Export and import restrictions', 'Closure of market outlets', 'Cancellation/postponement of orders', 'Delay in payment', 'Supply chain problems' and 'Capital turnover problems' (Table 6).

Table 6: Constraints in silk trade due to Covid - 19 pandemic

Constraints	Total Score
Reduction in demand	69.7
Export & Import restrictions	65.0
Closure of market outlets	64.1
Cancellation/postponement of orders	56.3
Delay in payments	54.7
Supply chain problem	53.0
Capital turnover constraint	50.8

3.7

Situation in implementation of sericulture promotion programmes during/ after Covid - 19 crisis

The quality in implementation of programmes plays a significant role in bringing about outcomes and the level of implementation influences outcomes. If a programme is implemented poorly or even moderately well, its goals are unlikely to be achieved, or the results will be less significant. While 47.1% of the respondents informed that sericulture promotion programmes continued with modifications after the Covid - 19 crisis, 29.4% indicated that sericulture promotion programmes were continued as earlier during and after Covid - 19 crisis. About 11.8% of the respondents indicated that programmes were curtailed after the emergence of the crisis and the remaining 11.8% opined that the programmes were completely stopped.

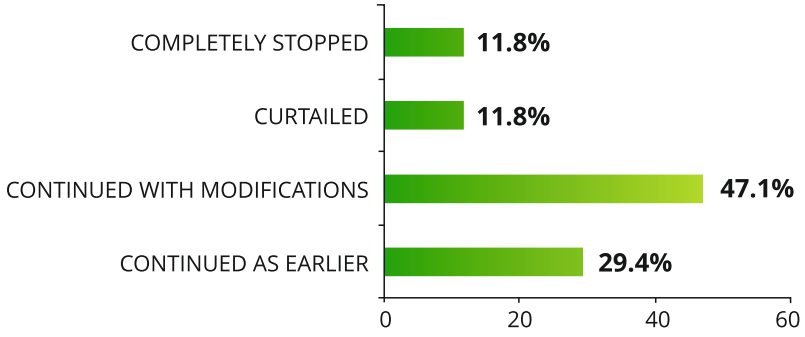


Fig. 6: Situation in implementation of sericulture promotion programmes

3.8

Expected time required for normalization

About 70% of the respondents have opined that at least another one year is required for the normalization of the industry from the present situation.

3.9

Support extended by the governments and other agencies to overcome the pandemic

The respondents indicated that the governments and other agencies have initiated various measures to overcome the problems faced in sericulture and silk industry due to Covid-19 pandemic. The measures reported by the respondents have been compiled and presented as below:

3.9.1

Technology modernization

CHINA Research initiated to exploit the antiviral properties of silk for containing the Covid - 19. 2) Modernized the existing technologies to align with the various activities of the silk value chain under SOP mode for protecting the industry stakeholders from Covid - 19.

INDIA Cocoon drying and storage facility were developed with low cost technology for preservation by farmer groups. 2) Developed SOPs for the continued functioning of silkworm egg production network. 3) Indigenously developed Automatic Reeling Machine (ARM), which hitherto was importing from China. The machine is being promoted to the field under the "Atmanirbhar Bharat" (self-reliant India) programme. "Atmanirbhar Bharat" is an initiative by the Govt. of India for transforming the country as a self-reliant nation, the idea of which was evolved during the Covid - 19 period.

THAILAND Expanded the purchase channels by developing online platform for Thai silk via website, applications such as Shoppe, Lazada, Facebook and Instagram platform.

PHILIPPINES Strengthening ICT capacities.

CUBA Study initiated to explore the potential benefit of mulberry leaves for boosting immunity against Covid - 19 and similar viral diseases.

JAPAN Researchers of Kyushu University are in the advanced stage of developing an oral vaccine for Covid - 19 using silkworm. The vaccine is expected to put for clinical trial very shortly. It is expected that the vaccine would be effective and affordable to common people.

3.9.2

Product diversification

CHINA

Some silk companies were switched over to produce mask and protective covers using silk, which emerged very popular among the people. Sericin skin care products were promoted extensively during the Covid-19 resulting in reducing the loss on account of the pandemic.

INDIA & THAILAND

Promotion of silk mask production.

3.9.3

Marketing Support

INDIA

As an immediate relief to the farmers, permitted direct marketing of cocoons to the reeling units during the lockdown period. Silk banks were revived to pledge the raw silk by releasing 75% of the cost of silk for continuing the reeling operations. Facilitated transportation of silk commodities during the lockdown period.

As part of encouraging online marketing of silk goods, Central Silk Board has entered in to an agreement with Amazon for providing separate platform for the marketing of silk goods. Similarly, the provincial governments and the silk manufacturing units have resorted to marketing of silk product through their websites and other online e-marketing portals by establishing tie-ups. This effort has substantially helped the industry to sell the silk products during the pandemic period.

CHINA The marketing of silk products were brought under the online platform. The government ensured that the cocoons from farmers are collected in time and payment released immediately.

THAILAND The Queen Sirikit Department of Sericulture organized trade fairs, fashion shows, etc., to promote/increase sale of Thai Silk. It has also arranged the stage for business matching with sericulture entrepreneurs during Covid - 19 crisis period.

PHILIPPINES The Government has extended transportation facilities and market support through procuring cocoons, silk fabrics and other products.

VIETNAM The Government allowed free trading and simplified administrative procedures which in turn helped traders during the pandemic.

3.9.4

Subsidies, incentives and tax exemptions

INDIA	Cash subsidies were provided to cocoon producers for offsetting additional burden due to Covid - 19. Continued to incentivize investments and other facilities to the various stakeholders of silk industry under the national programme of Govt. of India namely; "SILK SAMAGRA". The labour requirement of the sericulture and silk industry were channelized through convergence of another Government of India programme namely; MGNREGA, wherein the labour cost is paid by the government.
BRAZIL	Young age silkworms were freely distributed to the farmers.
THAILAND	The government launched a campaign of providing cash subsidy to farmers (including sericulture farmers) who have registered with the Ministry of Agriculture and Cooperatives. Tax exemption was extended to all sericulture commodities.
JAPAN	While the farmers were supported to undertake the rearing activities by Dainippon Silk Foundation, the reeling and weaving companies were provided necessary support by the Ministry of Economy, Trade and Industry.
PHILIPPINES	The Government has extended subsidy for mulberry cultivation, rearing houses and equipment. The Government has also provided free training, technical assistance and transport facilities for larvae and cocoons. Also subsidized the cost of planting materials, silkworm eggs and larvae.
EGYPT	The NGOs provided silkworm eggs, free of cost to the farmers.
KENYA	The Government provided 5% tax reduction during the pandemic situation.
ITALY	The Government has deferred tax and extended social security payments. Financial support was extended to workers and ordered all the companies not to retrench the workers.

3.9.5 *Credit Support*

INDIA

The Government implemented schemes for moratorium and rescheduling of EMI payments for the loans obtained from the commercial banks and financial institutions during 1st March 2020 to 31st December 2020. Under ex-gratia payment scheme, the Government borne the difference between compound interest and simple interest for six months with outstanding loan up to INR 20 million for the period from 1st March 2020 to 31st August 2020.

MADAGASCAR

The Government has created a credit fund to support producers and stakeholders to restart/expand their activities.

ITALY

The Government provided non-repayable and subsidized lines of credit.

NIGERIA

The Government has provided credit support to farmers at low interest rates to enable them to remain in the business. The Government also provided other types of financial support to remain them in the activity during the Covid - 19 crisis period.

3.9.6

Policy Support

CHINA

In order to ease the pressure on the enterprises, the National Cocoon and Silk Coordination Office issued "Notice on the Further Work of Cocoon and Silk Industry Development" to stabilize cocoon production, focus on poverty alleviation and encourage "Consumption Replenishment".

INDIA

The existing policy of the government to transact cocoons and raw silk through the government market was relaxed during the lockdown period thereby facilitating the stakeholders to freely transact the commodities. Import of ARM from China has been banned to promote indigenously manufactured low cost ARMs. The custom duty for the import of raw silk has been increased from 10% to 15% thereby enabling better price realization of domestic silk. These actions are substantially benefitting the farmers.

MADAGASCAR

The Ministry of Agriculture, Livestock and Fishery has put in place the Direction of valorization of animal products which works mainly to diversify livestock products so that more value will be added.

3.10

Opinion/suggestions provided by the respondents to mitigate the problem

The opinions/suggestions listed out by the respondents to mitigate the present crisis are furnished below:

3.10.1

Research

- Develop region specific improved technologies to grow mulberry and raise silkworms with reduced labour and input costs.
- Support eco-friendly organic silk production process, adopt energy saving techniques, promote climate resilience sericulture, etc.
- Promote the research and development of nano technology in silk fabric.

3.10.2

Product development & diversification

- Focus on research and modernizing biotechnology to make use of mulberry leaves, silkworms, and cocoons to produce cosmetics, pharmaceuticals and alternative medicines. Focus on the development of silk products for medical protection, sanitation and health such as washable silk protective masks, use of silk for cosmetic industry, use of silk protein for enhancing immunity, use of silk for healthy home textiles etc.
- Effective utilization of by-products is essential for the reeling units to enhance earnings. Pupae processing and drying packages are required to be upgraded.
- Promote silk handicraft, jewelry and artisanal products.

3.10.3

Support to producers

- The silk producing countries should extend subsidy/incentives to the grass-root level stakeholders.
- Improved varieties of food plants, and disease resistant and high quality silkworm races may be provided to the farmers for enhancing the production, productivity and quality of silk.
- An effective extension mechanism may be put in place to disseminate technologies and innovations to ward off exigencies like Covid - 19.

3.10.4

Price stabilization

- There should be a price mechanism framework and price stabilization fund for silk commodities for the sustained development of sericulture industry.
- An inbuilt mechanism may be developed in collaboration with related agencies to periodically review and assess for determining and stabilizing the price of silk commodities.
- The government must ensure that the enterprises should follow reliable and credible procurement policies.

3.10.5

Marketing

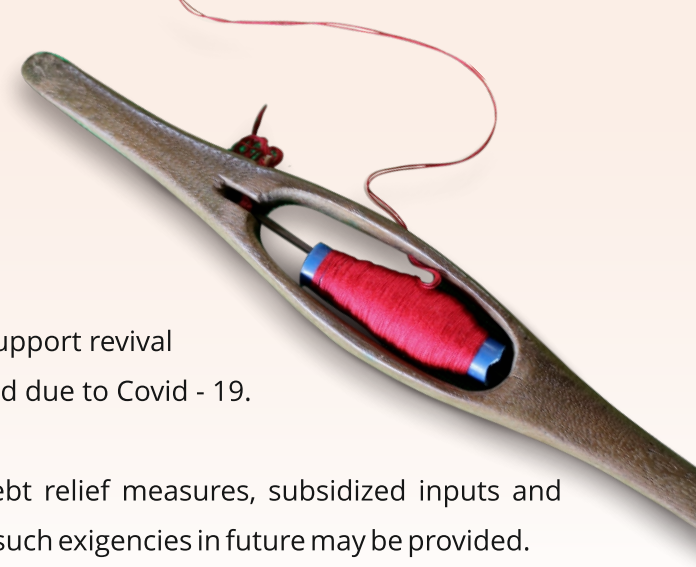
- Explore use of online platform for trading in addition to traditional methods.
- Create a stable consumer market for purchasers.
- Market expansion, distribution channel expansion and advertising sericulture products.
- A mechanism may be setup that can directly address the problems related to trade services.
- The silk manufacturing companies may be encouraged and supported for finding new markets.
- Effort may be taken up by the governments and other agencies to develop new products and innovative marketing tools that attract young consumers.
- The entire silk value chain activities may be remodeled to align with the sustainable fashion concept of silk.
- The opportunities of silk available in the global market may be explored through international tie-ups and collaborations. However, every effort may be put in place for developing a strong domestic market so that emergency situation like Covid - 19, could be effectively countered.

- The governments need to gradually remove barriers to restore trade and market activities in order to limit the impact of the epidemic.
- In order to promote trade in domestic and international markets, the Government should encourage and support the entrepreneurs to independently promote trade, create own brands and establish cooperation with other companies.

3.10.6

Supply chain management

- The enterprises may be encouraged to invest in silk processing chain similar to a cooperative farming model. Such enterprises can supply silkworm eggs and raw materials and in turn purchase the end products from the participants at a reasonable price.
- Local authorities and enterprises should actively mobilize resources to participate in building and upgrading mulberry silkworm breeding systems, transferring and developing new high yield mulberry varieties and silkworm races.
- Establish long term and stable domestic and foreign trade partnerships, expand cooperative areas and enhance anti-risk capabilities.
- Focus on solving the issues related to sourcing of silkworm eggs in accordance with silkworm rearing schedule.



3.10.7

Fiscal Support

- A capital/corpus fund may be created to support revival of sericulture activities that was interrupted due to Covid - 19.

- Insurance protection, interest subsidy, debt relief measures, subsidized inputs and creating awareness on Covid - 19 or similar such exigencies in future may be provided.

- The Governments should continue with tax subsidies or exemption policy. This measure would have the potential of stimulating domestic demand and at the same time help the enterprises to clean up the inventory thereby recover from any losses occurred due to the pandemic.

3.10.8

Policy Support

- While the government's agencies may act as a facilitator and policy regulator, the private sector may undertake identified entrepreneurial activities to evolve as a public private partnership collaboration.

- Adopt the policy of developing a strong domestic market for long term sustainability of the silk industry. Promote traditional designs in local silk weaving clusters by integrating with present day products.

- Create and roll out a mechanism to determine the price of silk commodities based on internally accepted quality parameters.

3.10.9

International Co-oporation

- Active cooperation with international organizations to attract financial support.
- Collaborative actions on research and development, networking and regulating quality silkworm egg supply and transfer of technologies and innovations.
- Create awareness on the trends and direction of global silk industry.
- Popularize the silk as an eco-friendly material with special emphasis on its special qualities in use and disposal.
- The mulberry plant may be promoted around the world as a beautiful and useful plant, which would improve human health and create new opportunities for the rural population.

3.10.10

Others

Establish a strong sericulture information network involving the farmers, reelers, weavers and traders.

Establish a mechanism to control the use of spurious silk products in coordination with the respective government and regulatory agencies.

The enterprises may effectively use the resources including available infrastructure and manpower to become viable and competitive.

3.11

Suggestions of Industry Experts

The opinion and suggestions given by the silk industry experts who have participated in the survey are summarized as below:

- The animal husbandry part of sericulture; i.e., silkworm rearing, closely correlates with the activities of health service sector. Hence, the silkworm rearers may be termed as silkworm health workers thereby extend them the much needed importance.

- The onset of Covid - 19 has created unforeseen hazards of different dimension wherein no protective measures were readily available for adoption. In order to effectively face such situations in future, extension workers and the industry participants may be provided with Personal Protective Equipment (PPEs).

- The facilities of sericulture industry may be appropriately reoriented to align with the SOPs of any eventualities. There is a greater need for mechanizing the various activities of the industry to effectively continue the operations with limited human presence.

- Insurance schemes for extension workers may be introduced similar to health sector.

- Occupational health and safety related awareness/ training programme may be conducted nationwide. The complacent approach of sericulturists and reelers should be mitigated through regular awareness and training programmes.

- Silk as a material is good for pharmaceutical sector. Developmental programme on use of silk in medical textiles may be initiated.

- Geotextiles application in different level of sericultural activities in pre-treated devices with antibacterial, antifungal and antiviral finishes should be advocated to minimize the potential infection caused or likely to cause due to similar disease outbreaks.

- "Covid - 19 rebate scheme" to clear off silk goods may be introduced to exhaust the stock and create liquidity and working capital for reviving the value chain activities.

- Now, the focus must be to increase productivity and quality of the output at each stages of the production processes.

- As a matter of policy intervention, sustainable development approach under UN's Sustainable Development Goals should be adopted in silk industry.

- Silk products currently include made-up, garments and home textiles. The potential for the use of silk in pharmaceutical, nutraceutical and cosmetic industries may be explored. This approach would broaden the utility of silk and silk products.

- Moratorium on the interest/instalments on borrowed capital including working capital may be continued for a longer period.

- Tailor made relief package for silk industry to sustain the loss due to the impact of Covid - 19 may be developed and implemented.

- A sericulture database comprising all the stakeholders of silk value chain may be developed so that the support and assistance can be transferred without logistical hassles.

- Promotion of Integrated Farming System (IFS) like silk – milk, silk-fisheries, and other combinations like medicinal plants, inter cropping systems may be taken up.

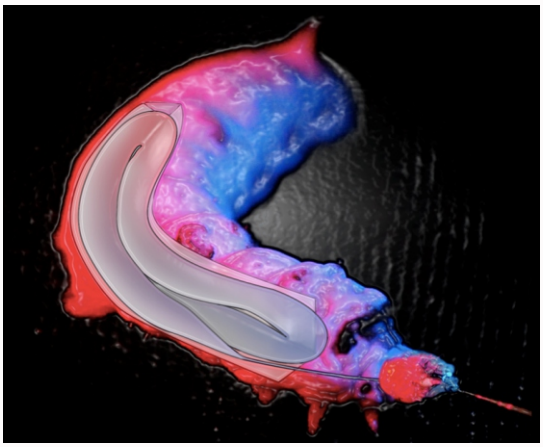
- Integrated pest management, by-product utilization, recycle-reuse, effective water management, mulberry tree cultivation, bio-diversity, climate resilient sericulture, etc., are necessary for increasing the net profit and sustained growth of silk industry even during the crisis period. Development and utilization of low-carbon and environment friendly silk fabric is the need of the day.

- Bio-material application of silk protein for pharmaceutical, surgical and cosmetic industry, industrial use of sericin and increased by-product utilization are likely to change the silk industry scenario in the coming years. Silkworm continues to be an important tool for genetic studies after Drosophila. Use of silkworm host plants for non-textile activities like jam, jelly, juice made out of mulberry fruits, Seri tea, mushroom growth, cordyceps, cattle food, use of mulberry timber for sports materials like cricket bat, mulberry tipped hockey stick, tennis bat etc. could promote sericulture industry.

- The product development activities to cater to the change in fashion trend mainly in garment, lifestyle products and home textile sectors may boost silk export. Silk knitted T shirts, readymade garments especially under garments, kids wear, and sportswear have potentiality to boost export as well as domestic market.

- R&D to focus on silk blended fabric with some innovation on dye absorbance and easy maintenance as in polyester fabrics and price affordability would attract middle class customers that can substantially enhance the demand for silk.

- Silk being the queen of textiles, will always have market value because of its superiority, luxury, and aristocracy. It is necessary to explore the merits of silk industry such as women empowerment, carbon sequestration, rural employment, eco-friendly production process, green cover, etc., for availing resources from



International agencies as also from government agencies. Therefore, the present motto for revitalization of silk industry should be “Engage, Explore, Experience, Express and Excel” in all the areas of silk value chain.

Shrinking the enterprises expansion and opening up online sales can be the important strategy for silk domestic trade enterprises this year to reduce losses and overcome difficulties.

The sales model need to be upgraded for digitalization and networking, the sales channels may be equipped to accelerate the expansion of online stores, the service methods may be reoriented to rapidly change to new service industries such as customization, and the logistics methods will become more social and convenient.

Governments under the premise of ensuring epidemic prevention, may relax the logistics restrictions of enterprises and restore the production order as soon as possible; preferential policies and measures should be operable; and issue related to policies or measures to stimulate domestic consumption may be taken up.

The industry partners may; first guide members in scientific prevention and control, and do a good job in internal management and situation reporting. Secondly, classify and assist enterprises to solve problems such as material security, logistics transportation, and supply of production materials. Thirdly do a good job of guiding public opinion and reporting information, enhance the confidence and determination of enterprises to win the epidemic battle and achieve sustainable and stable economic development, strengthen communication with the industry authorities, and reflect the demands of enterprises in a timely manner.

Silk enterprises should control the cost strictly than ever before. In difficult times, enterprises must reduce all unnecessary expenses, strictly control the purchase price of raw materials, strictly control the quality, reduce quality costs, and control the total wages of enterprises. Increase income and decrease expenditure, living within the means, and every penny save may help the enterprises to survive.

4

Summary and Recommendations

The Covid - 19 pandemic caused massive economic shock across the world due to business interruptions and shutdowns from social-distancing measures. Due to the widespread closure of industrial activities, trade and trade related services were plummeted to unprecedented levels. The downfall was very quick but the economic recovery would be very slow and painful. Among the sectors, agriculture is quick to recover as its produces happens to be more essential than the precious metals during the crisis. By reorienting the supply chain mechanism, the governments and related agencies have succeeded in bringing the much needed stability to agriculture sector. But much more has to be done to bring the industry back to the pre-Covid scenario. The problems in other sectors continue to persist warranting more time and investment. The silk industry can be bracketed under the industrial sector, where the impact was severe.

Silk industry is one of the labour intensive sectors compared to other rural avocations. It is considered as the ideal avocation for poverty alleviation, employment generation and rural development. The industry is famously known for converting the family labour into productive use among the poor and marginal farmers and through micro-level enterprises. The silk value chain is very complex and can be broadly categorized under agriculture, animal husbandry and industrial activities. There are more than 20 activities in the value chain, each of which employ skilled persons and are closely interlinked for determining the quality of the final product. The attack of Covid - 19 has seriously disrupted this complicated and fragile silk value chain. The entire activities of the industry has plunged in to a standstill due to the lockdown and Covid control measures. Unfortunately, the Covid attack was acute in countries like Europe, USA, Japan, India and among the affluent classes of many countries where the silk consumption is traditionally high. The special occasions that are synonymous with the use of silk dresses have completely stopped due to restrictions. For the general silk consumers, silk dresses are not a priority item during the distress time. Such purchases are kept pending for a better time. All these developments have brought down the demand of silk to the bottom level.

The pandemic adversely affected all the activities required for the orderly functioning of silk industry such as silkworm egg production and distribution, silkworm rearing, silk reeling, silk weaving and processing, domestic and international trading and supply chain management. As the demand for silk products are affected due to economic recession, most of the respondents participated in the survey opined that it would take almost a year for the industry to come out of the worst situation. The Governments of the silk producing and processing countries have already initiated many measures such as providing subsidy to the producers, credit support, tax exemption, organizing trade fairs to sell the silk products, protecting the employees from retrenchment, etc. As many vaccines for Coronavirus have already been developed and started administering to the people in many countries to save the life, the pandemic may recede sooner or later.

We have also observed through this study that the situation among the silk production bases is largely improving now due to the active interventions of the governments. However this improvement alone will not succor the industry back to normalcy. Historically, the silk consumption is directly related to the economic improvement of the population. Since silk is a luxury item, enough money in the hands of the consumers can alone spur the demand. The IMF predicts that the world economic recovery itself will take three years and it will only be at the end of 2022 that per capita GDP will be back at pre-Covid - 19 levels. The actual recovery in fact will take even longer since the IMF's figures don't take into account inflation. These facts may practically make us to believe that about 3 years may be required for the silk industry to reach its optimal level. Apart from the problems occurred on account of the attack of Covid - 19, silk industry is also besieged with many issues warranting urgent attention by the authorities.

Since large number of people from the economically backward sectors are involved in silk industry, it is necessary to protect them from any adversaries. Keeping in view of these facts and based on the findings of the Covid impact assessment study, International Sericultural Commission has charted out a Plan of Action for the comprehensive development of global silk industry with special emphasis on recovering the industry from the problems encountered due to the Covid - 19.

These recommendations are briefly given below:

4.1

Stimulate demand through innovative marketing

The immediate task for the policy planners must be to enhance the demand for silk products in the market. The practical way of doing this can be to adopt e-marketing strategy for selling out the silk goods. The silk producing countries may develop and introduce dedicated "Silk Portals", which can act as a platform for the manufactures to connect with the buyers across the globe to sell pure silk products. While the governments can at best vouch the purity of silk through a label, a nominal fee can be charged for maintaining the portal. The provincial governments, designers, fashion industry and other stakeholders of the industry can be integrated into this portal. Alternatively, the governments may enter into collaborations with online retail traders like Walmart, Amazon, Flipcart, Alibaba, etc. to develop a platform for the silk manufacturing companies and enterprises to market pure silk products crossing boundaries and barriers. However, such trading mechanism may be insulated with regulations to protect the interest of the consumers by trading only pure and quality silk products.

4.2

Product Diversification

This strategy is used to increase the sales associated with an existing product line, which is especially useful for a business that has been experiencing stagnant or declining sales. During the crisis situation, few companies in China have developed silk masks and promoted it by tagging the antiviral properties of silk, which was very popular in the market. There are also enormous scope for

product diversification of silk considering the fact that thousands of geographically specific ethnic designs of silk are available all across the weaving clusters located in the nuke and corners of the world for exploitation. These designs can be replicated in the present day products that can bring wider acceptability among the younger generation and consequently spur the demand for silk. Product diversification can also be resorted in other modes like; knitted fabrics, blending, technical textiles, use of silk undergarments, socks, sportswear, etc. In short, product diversification must be considered as a dynamic component thereby expand the consumer base of silk products for enhancing the demand of silk.

4.3

Generic Promotion

The historic travel of silk fiber as a material of immense value and desire through almost all the ancient civilizations of the world like ancient China, Mesopotamia, Indus Valley, Egypt, Persia, Greek, Roman, Byzantine, Otomian, Mongol, etc., has created a Royal Image for SILK bestowed by rulers and consumers alike. May be silk is the only fiber that has been widely accepted in all these civilizations. Taking cue of this rich legacy, generic promotional activities for silk may be taken up all across the globe. For aligning with the preference of the present-day consumers, special efforts may be adopted for highlighting the eco-friendly characteristics of the silk, the involvement of poor and downtrodden people in the production process and the contribution of silk industry for achieving the SDGs mandated under United Nations. These measures, apart from significantly enhancing the demand of silk in the global market would also ensure maintaining the rich legacy of silk for posterity. Promotional activities may be continued in the domestic market to ensure stability to the industry, even during a crisis situation.

4.4

Federation of Stakeholders

The fragmented production base was one of the major impediments for reaching out and providing support to the stakeholders of silk industry during the pandemic period. Federating stakeholders at each stages of the silk value chain is also important to enhance production, productivity and quality of silk. Hence, the existing extension machinery may be reoriented to federate the stakeholder's atleast at district level for synchronizing production processes, dissemination of innovations and technologies, extending support measures in kind or cash through digital medium, undertaking marketing operations, and facilitating emergency response measures in times of exigencies like Covid - 19. The services of Community Based Organizations (CBOs), Farmer Producer Organizations (FPO), cooperatives, NGOs and private parties may be involved for this purpose.

4.5

Strengthen support mechanism

It is observed that some of the support mechanism existed in few countries like; cocoon drying and preservation chambers, Silk Yarn Bank, etc., were extremely useful during the crisis. Hence we recommend that this mechanism may be continued in the existing areas and replicated in other countries too. The temporary measure taken in the Indian State of Karnataka for the direct marketing of cocoons to reeling units is praiseworthy which need to be continued with appropriate guidelines. The other measures of the government agencies like; organizing transportation, price subsidy, tax exemptions, loan moratorium, indigenous production of machineries, etc., are good which can be continued and replicated in other regions too.

4.6

Consider Contract farming methodology

Very few contract farming models are operating in silk sector. Reports emanating from few of such companies in Thailand, Brazil and Uzbekistan indicate that they could easily ward off the problems during the pandemic due to the intrinsic nature of the inbuilt arrangements in the system. As these companies have a permeant tie up with the farmers and a confirmed market, no unforeseen problems were witnessed. The modus operandi of Chinese silk industry is also based on these lines of operations, if not the same concept. Hence, there is an urgent need for developing Contract Farming Companies in countries like India, where the existing farmer base is fragmented, resultantly not able to produce internationally gradable silk in large quantities on a consistent basis. If such companies cannot be developed due to policy issues, the idea could be intertwined in the existing system.

4.7

Eradicate Spurious silk

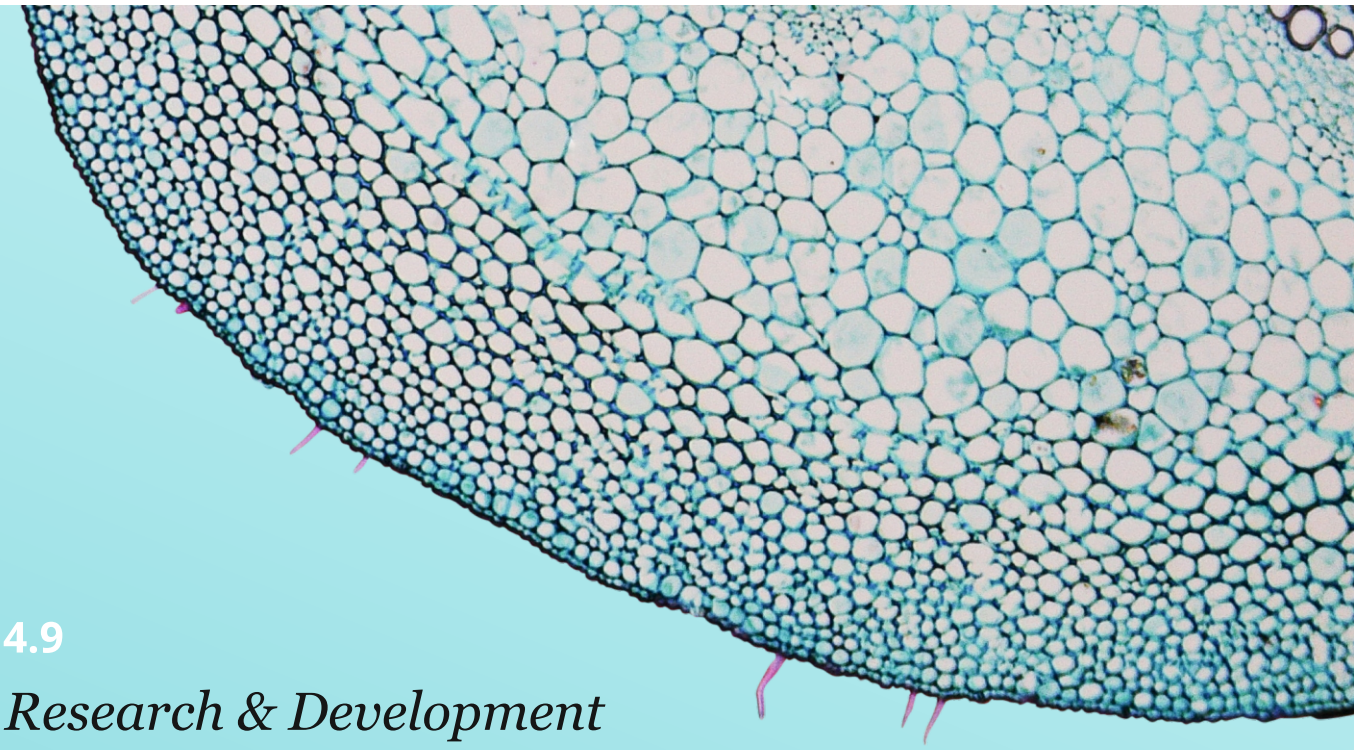
The recent reports emanating from the silk markets indicate that spurious silk products are flooding the market with the easing of Covid - 19 restrictions. This issue is more prevalent in Thailand, India, Vietnam, Philippines, Bangladesh, Srilanka, etc. Coupled with this, raw silk is smuggled and sold at cheaper rates in certain countries. The Most Favored Nation (MFN) status allotted to certain countries is misused by the market players for fraudulently dumping silks, very often of inferior quality. These issues are creating considerable harm to the already fragile silk industry. The governments must take immediate policy action to regulate these illegal activities.

Further, the word 'Silk' is used with all types of products like Shampoo, synthetic fibers, cotton, etc. This is not a good practice and would adversely affect the image of silk. The International Sericultural Commission may take appropriate action in consultation with World Intellectual Property Organization to prevent the illegal use of 'Silk'. The word 'Silk' must be allowed to use only for pure silk products.

4.8

Domestic consumption

Domestic demand is a sustainable option for the silk industry, especially in a situation like Covid - 19. Hence the countries must give utmost attention for developing a stable domestic market for silk by innovating and promoting new products suiting to the taste of the consumers. The countries who are attempting to introduce sericulture may initially think of catering to the need of the domestic population, at least for a period of 10 years.



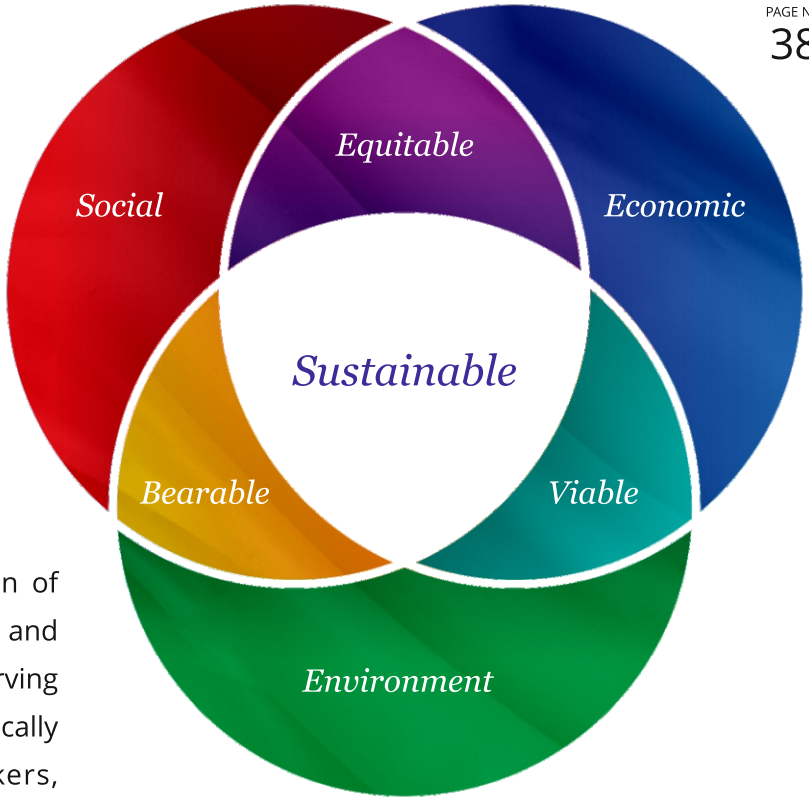
4.9

Research & Development

In the coming days, horizontal expansion of sericulture would be a difficult proposition due to the increasing demand of arable land for agriculture and the emerging shortage of water, even for the drinking purposes. Hence, R&D focus must be to develop technologies and innovations for maximizing the production through productivity improvement and to ensure that whatever silk produced are of good quality. Targeted R&D efforts are also needed for developing machineries for on-farm activities to make the industry more viable and competitive. In countries other than China, priority should be given to develop indigenous post cocoon machineries that produce gradable silk. The post cocoon R&D institutions must think of collaboration with qualified mechanical designers or reputed machinery development institutions for developing advanced machineries for post cocoon technology.

4.10

Sustainability



Sustainable production is the creation of goods and services using processes and systems that are, non-polluting, conserving energy and natural resources, economically viable, safe and healthy for workers, communities, and consumers. In many countries, the consumer's choices are increasingly inclined to sustainable products, more particularly the textile materials. Consequently, production of many textile fibers are in the path of change with the aim of manufacturing environmentally sustainable products by suitably transforming the production processes.

Of late, some sections of the apparel and fashion industry have developed a sustainable Index which portrays silk as the least sustainable product, said to be due to the excessive usage of water, energy, chemicals, pesticides, etc., during the production process. While the ISC is in the process of countering this narrative and removing the index, we find that some of the silk production processes are required to be properly revised to make the industry environmentally sustainable. With the development and introduction of sustainability guidelines by International Organization for Standardization (ISO) and the Product Environmental Footprint Category Rule (PEFCR) by EU, the future trade of silk in many developed countries would be subject to complying the sustainable production standards. Hence it is critically important for the silk industry to switch over to sustainable production processes. In the hindsight, this is not an easy proposition. For this to happen, the governments may take immediate steps for commissioning dedicated research on developing sustainable sericulture practices that are suitable to their respective countries.

4.11

By-product utilization

Of late, innumerable innovations have been witnessing all across the world on the use of silkworm, silk and silk by-products in areas like; pharmaceutical, nutraceutical, FMCG, and many industrial products. As explained earlier in this report, the researchers of Kyushu University has developed a vaccine for Covid - 19 using silkworm. It is expected that the vaccine would be effective and affordable to the common man. There are also enormous opportunities for intensifying the commercial exploitation of sericulture by-products like; mulberry tea, mulberry fruit products, paper production from mulberry, pupae oil, cattle feed, chitosan, cocoon handicrafts, etc. The onus is now lying with the governments to commercially exploit these products through industry tie-ups so that the silk farming become more viable and resultantly additional jobs could be created.

4.12

Global Study

The last time a global study on silk industry was undertaken during 2001 by the International Trade Centre (ITC). The ITC has discontinued this important exercise due to financial constraints and the attempts by ISC to revive the same could not be succeeded. This study would have been extremely useful for the global silk industry during the crisis to understand the actual trend on production, demand, consumption, product choice, etc. Being the dominant leaders of the silk industry, China and India may join together to revive this annual study under the aegis of International Sericultural Commission (ISC). As part of this initiative, a **"Global Information System on Silk and Silk Commodities"**, with the aid of artificial intelligence, may be developed and operated from ISC HQs for the benefit of industry stakeholders.

4.13

International collaboration

It is extremely important for the governments and the industry partners to establish international collaborations that can bring significant improvements in production, processes, quality, trade, and trade related activities. The silk producing countries may explore the possibility of sourcing financial assistance from UN affiliated funding agencies as the silk sector activities are largely align with the UN designated Sustainable Development Goals (SDGs). In such cases, ISC can help the countries to undertake feasibility studies by availing the services of ISC Volunteer Experts, prepare comprehensive developmental projects, source supply of resources, equipment's and machineries and vet and forward the projects to the funding agencies for extending financial support.

4.14

Silk Manufacturing Companies

The silk companies should make full use of the current policy support, actively apply for low-interest loans, reduce foreign investment, optimize the internal structure of the enterprise, rationally control production costs and expenditures, avoiding difficult capital turnover or broken capital chains. For the different stream of activities, the strategy can be; *Production* - actively adopt information management, achieve rapid response from upstream to

downstream of the supply chain and reduce inventory; *Trade* - establish long-term and stable domestic and foreign trade partners, expand cooperation areas, and enhance anti-risk capabilities; *Products* - **i**mprove products quality, strengthen innovation, research and development. Focus on the development of silk products for medical protection, sanitation and health, such as silk masks, silk home textiles, etc., and *Sales* - **r**elying on the internet, make full use of the sustainable fashion concept of silk, and explore the path of "Internet + Traditional industries", attracting young consumers.

4.15

Private Investment

Private participation in post yarn sector is one of the major highlights of the silk industry since time immemorial, which proved to be quite successful. Of late, private investment is happening in on-farm sectors like; silkworm egg production, young age silkworm rearing (Chawki rearing), soil to silk producing companies, etc. This development is very encouraging and providing the much-needed impetus to the core area of the industry where large number of poor people could be employed. On the other hand, this intervention is transforming the industry more viable and aiding in enhancing production, productivity and quality of silk. Hence, the governments may, on priority, consider attracting private investments in on-farm sector thereby transforming the silk industry from the existing level of a subsidy-oriented avocation to a commercially viable economic entrepreneurial activity.

Endnotes

[1]UNCTD (2020) Impact of the Pandemic on Trade and Development - Transitioning to a New Normal, United Nations Conference on Trade and Development New York, PP. 8.

[2] International Silk Union, China, Report; Impact of Covid - 19 on International Silk Industry and Consumer Market Trends, **http://en.worldsilk.com.cn/static/upload/file/20200506/1588776214608703.pdf,** accessed on January 11, 2021.

[3] Ministry of Textiles (2020) Effects of Covid - 19 Pandemic on Textile Sector, **https://pib.gov.in/PressReleasePage.aspx?PRID=1656233**, Accessed on January 11, 2020.

[4] Globe Newswire (n.d.) **https://www.globenewswire.com/news-release/2020/07/30/2070062/0/en/Global-Silk-Industry.html**, Accessed on January 11, 2020.

[5] For methodology, please refer Dhanavandan S (2016), Application of Garret Ranking Technique: Practical Approach, International Journal of Library and Information Studies, 6(3): 135-140, **http://ijlis.org/img/2016_Vol_6_ Issue_3/135-140.pdf**, Accessed on 5 January 2021.

Annexure - IA

Impact Analysis of *Covid-19* on Global Silk industry

Survey Questionnaire

I. General Information

1. **Respondent Name**

2. **Address**

E-mail **Mobile**

3. **Country**

4. **Nature of the Organization**

- ○ Government
- ○ Quasi-Government
- ○ Non-Government
- ○ Commercial

5. **Are you a member of any international organization involved in the promotion of sericulture/silk industry?** ◯ Yes ◯ No

If yes, tick the appropriate box

i. International Sericulture Commission (ISC) ◯

ii. International Silk Union (ISU) ◯

iii. The Black, Caspian Seas and Central Asia Silk Association (BACSA) ◯

iv. Others (Please specify) ▶

6. Field of operations

i. Research/technology innovation ◯

ii. Extension/rural development ◯

iii. Silkworm egg production ◯

iv. Host Plant Development ◯

v. Cocoon production ◯

vi. Reeling ◯

vii. Post-yarn activities (Weaving, processing etc.) ◯

viii. Trading ◯

ix. Others (Please specify) ▶

7. Production status during 2019

Particulars	Production (Please specify unit clearly for each item)	Price (Please specify unit clearly for each item)
Silkworm eggs		
Cocoon		
Raw Silk		
Silk commodities (Please Specify)		

8. Foreign trade during 2019

a) Value of Silk Exports (Mn US $) ▶

b) Value of Silk Imports (Mn US $) ▶

9. Total turnover of silk industry in

your country (Million US$) ▶

II. Impact of Covid - 19 crisis

1. **Is the Covid - 19 crisis still persisting in your country?** ◯ Yes ◯ No

If yes, the incidence level ◯ Acute ◯ High ◯ Moderate ◯ Low

2. **Is the economy affected due to Covid - 19?** ◯ Yes ◯ No

If yes, the anticipated growth rate in GDP in 2020 (as per the Government estimate) ▶

3. Incidence of Covid - 19 in the silk producing/processing areas

i. Acute ◯	ii. High ◯	iii. Moderate ◯
iv. Low ◯	v. Very low ◯	

4. Is still the Covid - 19 incidence persisting in silk producing/processing areas? ◯ Yes ◯ No

5. Loss of production and operations due to Covid - 19 pandemic (Year-on-Year)

a) <60% ◯	b) 40-60% ◯	c) 20-40% ◯
d) 10- 20% ◯	e) 1- 10% ◯	f) No loss ◯

6. Increase in operating cost due to Covid - 19 (Year-on-Year)

a) >60% ◯	b) 40-60% ◯	c) 20-40% ◯
d) 10- 20% ◯	e) 1- 10% ◯	f) No loss ◯

7. Economic loss to the industry due to Covid - 19 (Year-on-Year)

a) >60% ◯	b) 40-60% ◯	c) 20-40% ◯
d) 10- 20% ◯	e) 1- 10% ◯	f) No loss ◯

8. What is the situation of silk industry during the first half of 2020 compared to the same period during 2019?

Particulars	Unit (Please specify clearly kg/ MT/US$/.....)	January - September 2019	January - September 2020
Cocoon production			
Average cocoon price per kg			
Raw silk production			
Average price of raw silk per kg			
Consumption of raw silk			
Silk fabric production			
Value of fabric production			
Value of silk exports			
Value of silk imports			

9. Major problems faced due to Covid - 19 pandemic:

Sl. No	Constraints	Please rank separately for each activity, whichever is applicable
I. Silkworm egg production		
1	Problems in generation of parent seed cocoon	
2	Problems in procurement of parent seed cocoons	
3	Problems in Production of Commercial silkworm egg.	
4	Problems in supply of silkworm eggs	
5	Decrease in demand for silkworm eggs	
6	Non availability of workers	
7	Others (please specify)	

II.	**Cocoon production**	
1	Non-availability of silkworm egg	
2	Non-availability of other farm and silkworm rearing inputs	
3	Non-availability of workers	
4	Non-availability of transportation facilities	
5	Closure of market	
6	Crash in cocoon prices	
7	Others (Please specify)	
III. Reeling		
1	Non-availability of cocoon	
2	Non-availability of workers	
3	Crash in prices of raw silk	
4	Not able to sell the silk produced	
5	Working capital problem	
6	Cash flow problems	
7	Supply chain issues	
8	Government order to close the units	
9	Others (Please specify)	
IV. Silk weaving/processing		
1	Non-availability of silk	
2	Increase in labour cost	
3	Capital turnover constraint	
4	Delay in payments	

5	Supply chain problem	
6	Order Cancellation	
7	Reduction in demand	
8	Others (Please specify)	
V.	**Trade**	
1	Closure of market outlets	
2	Reduction in demand	
3	Export & import restrictions	
4	Delay in payment	
5	Capital turnover constraint	
6	Supply chain problem	
7	Cancellation/postponement of orders	
8	Other difficulties (Pease specify)	

10. What is the situation of sericulture promotion programmes during/after Covid - 19 crisis?

i. Continued as earlier ◯ Continued with modifications ◯

Curtailed ◯ Completely stopped ◯

ii. Please provide details for your answer (if required) ▸

11. Support extended by the Government and other agencies to overcome the pandemic

Sl. No	Particulars	Specify in 100 words (Provide details for the items whicheve is applicable)
1	Subsidy/incentives	
2	Credit support	
3	Corpus fund	
4	Marketing support	
5	Product diversification	
6	Technology modernization/digital intervention	
7	Tax exemption & strengthening of support systems	
8	Cost subsidy	
9	Procedural relaxation in export and import	
10	Price stabilization	
11	Business research	
12	Others (Pease specify)	

12. Opinion/suggestion to mitigate the problems of Covid - 19

Sl. No	Particulars	Specify in 100 words (Provide details for the items whicheve is applicable)
1	Support to farmers/entrepreneurs/industries	
2	Credit/Capital/Corpus fund Support	
3	Marketing	
4	Product development & diversification (Development of silk mask, PPE kit, silk protein for immunity and other medicine)	

5	Technology Modernization	
6	Tax exemption & strengthening of support systems	
7	Cost subsidy	
8	Procedural relaxation in Export and Import	
9	Price Stabilization	
10	Policy Revision	
11	Reforming supply chain constraint	
12	Prevention of spurious silk products on account of expected short supply of raw silk	
13	Research prospect of silkworm and silk for the control of microbes like Covid - 19	
14	Any other requirement (Pease specify)	

13. Expected time required from 1st December 2020 for normalization of the industry (check whichever is applicable)

1) < six months ◯ 2) 6 months - 1 year ◯ 3) > one year ◯

Annexure - IB

Impact Analysis of *Covid-19* on Global Silk industry

Questionnaire seeking expert opinion

- Please describe briefly about the impact of Covid - 19 on sericulture and silk industry at each stage of silk chain globally and in particular major silk producing and consuming countries:
- Briefly narrate the role played by the government/other agencies to mitigate the problem:
- Please suggest your opinion on the support needed from government and other agencies to mitigate the crisis that are related to sericulture and silk industry:
- Spell out some steps to be taken in the areas of policy modification, supply chain restraint, product development & diversification, technology upgradation, trade policy actions to minimize further damages of the industry due to Covid - 19:
- Please offer your suggestions (strategies/plan programmes) for the timeline (number of years) needed for stabilizing the industry:

Details of country-wise respondents participated in the survey

Country	Expert/Organization
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	The Secretary General, International Silk Union, Secretariat, ISU, P.C: 310004, Room 1606, Cathaya Mansion, Tiyuchang Road No. 105, Hangzhou, China. E-mail: isusecretariat@163.com. Accessed information from the published report "Impact of Covid - 19 on International Silk Industry and Consumer Market Trends" http://en.worldsilk.com.cn/about/ISUPurpose.html

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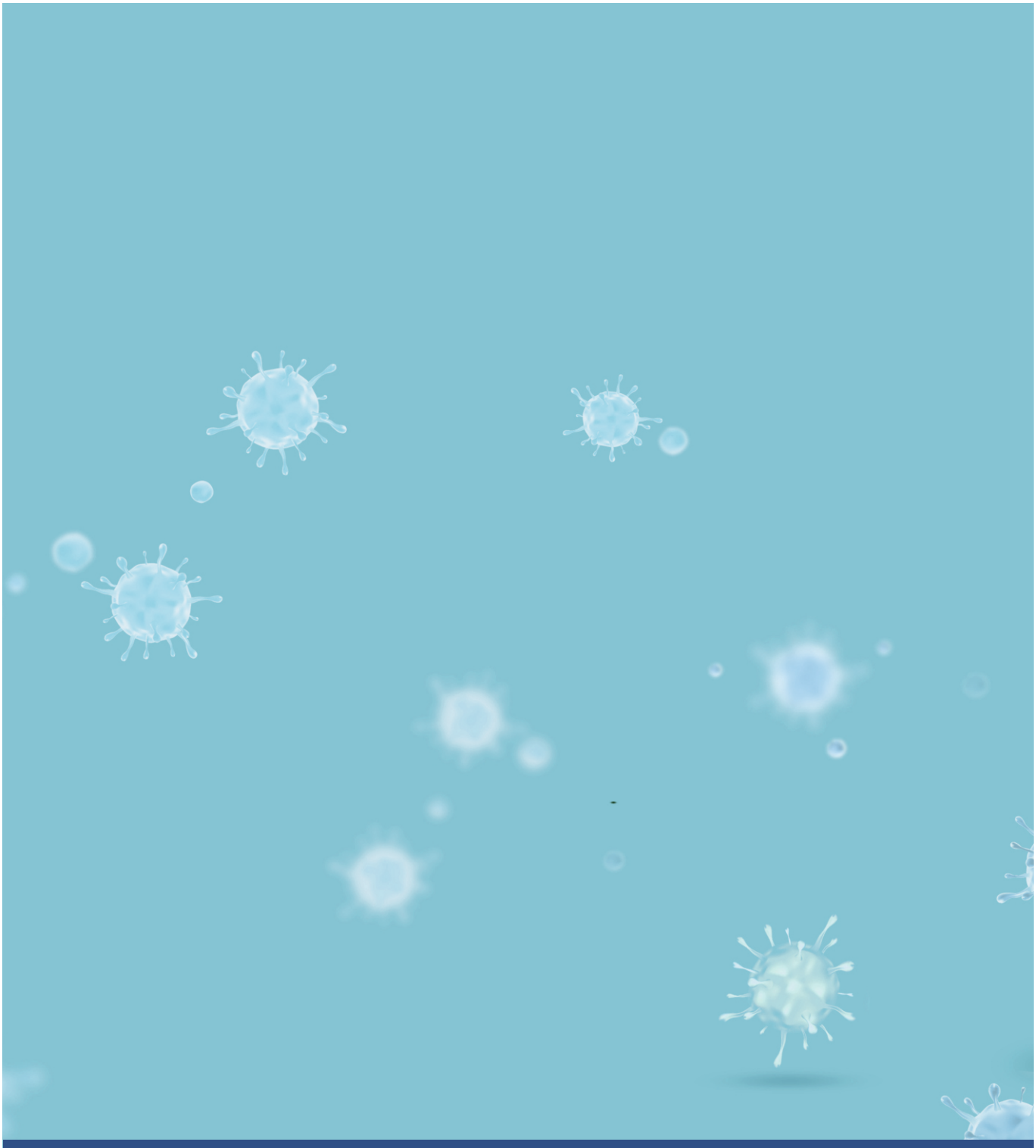
About the Authors

Rajit Ranjan Okhandiar

Mr. Rajit Ranjan Okhandiar is the elected Secretary General of International Sericultural Commission (ISC), the UN registered inter-governmental organization engaged in the development of sericulture and silk industry across the globe. He also holds the post of Chief Executive Officer of Central Silk Board (CB), Ministry of Textiles, Govt. of India, which is the national agency for the development of silk industry in India. Mr. Okhandiar is a senior officer from the elite Indian Forest Service (I.F.S.) cadre of Government of India. Mr. Okhandiar rendered his services in various Government Departments of Union and Provincial Governments for the last 32 years, mainly focussing on integrating sustainable developmental programmes for providing meaningful employment opportunities to the weaker sections of the society, especially women. Since his association with the silk industry from September 2017, many innovative ideas have been introduced in the silk industry, which contributed in enhancing the Indian silk production to record heights. As the Secretary General of ISC, Mr. Okhandiar strived hard to expand the base of ISC to new countries and areas, facilitated collaborated actions among the countries and protected the interest of silk at global level. The commissioning of a study on the "Impact of Covid-19 on global silk industry and the way forward", is one of the telling examples of his commitment for the development of silk industry.

Dileep Kumar R

Mr. Dileep Kumar R., is the Programme Coordinator and second in command in the Head Quarters of International Sericultural Commission, located at Bangalore, India. Mr. Dileep Kumar is a silk technocrat, who has been put into more than 36 years of service in the sector. After acquiring adequate knowledge and experience in the value chain activities of the silk industry, Mr. Kumar specialized in conceptual technocracy thereby formulating many developmental programmes and implementing the same at field level. He was also simultaneously deployed in the foreign affairs activities of Central Silk Board. Having thus associated with the activities of ISC since 1991, Mr. Dileep Kumar has been entrusted with the arduous task of shifting the ISC HQs from Lyon, France to Bangalore, India and the subsequent launching of its operations in India from 1st January 2013. The commitment and hardworking put forth by Mr. Kumar has led to the transformation of ISC as a credible international organization fulfilling the aspirations of the global silk fraternity. While working with three Secretary Generals of ISC, Mr. Kumar has been instrumental in the enrolment of 8 new member countries and 33 Associate Members into ISC fold, introduced many innovative activities like; volunteer expert programme, skill development training, scholarship programme, sharing of genetic materials, introduced new award on Excellence in Sericulture Science, consultancy, etc., organized 23 international events on silk industry, entered collaboration with other international organizations like; South Asian Association for Regional Cooperation (SAARC), African Asian Rural Development Organization (AARDO), International Silk Union (ISU), Discover Natural Fibres Initiative (DNFI), Deakin University, Australia, Indian Technical and Economic Cooperation (ITEC) programme of the Government of India, Black Caspian Seas and Central Asia Silk Association (BACSA), International Society of Wild Silk Moths (ICWS), and Asia-Pacific Congress of Sericulture and Insect Biotechnology (APSERI) and initiated many other activities for the development of sericulture and silk industry across the world. His passion for the silk industry is truly reflected in preparing this report, more particularly in evolving the Plan of Actions proposed for the revival of silk industry in the post pandemic period.



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