

FUNCTIONING OF CENTRAL SILK BOARD & PERFORMANCE OF INDIAN SILK INDUSTRY

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CENTRAL SILK BOARD
(Ministry of Textiles, Govt. of India)
BANGALORE-560 068

FUNCTIONING OF CENTRAL SILK BOARD & NOTE ON SERICULTURE

A. FUNCTIONING OF CENTRAL SILK BOARD

The Central Silk Board (CSB) is a Statutory Body, established during 1948, by an Act of Parliament (Act No.LXI of 1948). It functions under the administrative control of the Ministry of Textiles, Government of India, having head quarter at Bangalore. The Board comprises 39 members appointed as per the powers and provisions conferred by Sub-Section 3 of Section 4 of the CSB Act 1948, for a period of 3 years. The Chairperson of the Board to be appointed by the Central Government and two officials to be nominated by the Central Government, one of whom shall be the head of the Silk Division in the Ministry of Textiles as the Vice-Chairperson and one shall be the Secretary of the Board, both being the officers not below the rank of Joint Secretary to the Government.

In order to co-ordinate the sericulture development programmes in different States & for undertaking pre-shipment inspection of silk goods meant for exports, the Central Silk Board has established 8 Regional Offices at New Delhi, Mumbai, Kolkata, Hyderabad, Bhubaneswar, Guwahati, Lucknow, Patna. Regional Offices of CSB maintain a close liaison with the State Sericulture Departments, field units and CSB field functionaries to co-ordinate transfer of technology. Regional Offices are also conveners of State Level Sericulture Co-ordination Committee meetings constituted by the Central Silk Board. The existing staff strength of CSB is 2,882 as on 01.10.2018.

The mandated activities of CSB are Research and Development, maintenance of four tier silkworm seed production network, leadership role in commercial silkworm seed production, standardizing and instilling quality parameters in the various production processes and advising the Government on all matters concerning sericulture and silk industry. These mandated activities of Central Silk Board are being carried out by the 192 units of CSB located in different States through a integrated Central Sector Scheme viz “**Silk Samagra**” an integrated scheme for development of silk industry with the following 4 components:

1. Research & Development, Training, Transfer of Technology and I.T. initiatives.
2. Seed Organization.
3. Coordination and Market Development.
4. Quality Certification Systems, Export, Brand Promotion & Technology up-gradation.

1. RESEARCH & DEVELOPMENT, TRAINING, TRANSFER OF TECHNOLOGY AND I.T. INITIATIVES

The Research & Training Institutes of the CSB provide scientific and technological support for enhancing production and productivity for sustainable sericulture through innovative approaches. The main institutes at Mysore (Karnataka) Berhampore (West Bengal) and Pampore (J&K) deal with Mulberry sericulture whereas Ranchi (Jharkhand) deals with Tasar culture and Lahdoigarh, Jorhat (Assam) deals with Muga and Eri culture. Regional Sericulture Research Stations have been functioning for the development of region specific technology package and dissemination of research findings as

per regional needs. Besides, a network of Research Extension Centre (RECs) & its sub units are also functioning to provide extension support to sericulturists. In order to provide R&D support in post cocoon sector, the Board has established a Central Silk Technological Research Institute at Bangalore. In addition, the CSB has also set up Silkworm Seed Technology Laboratory in Bangalore (Karnataka), Central Sericultural Germplasm Resource Centre at Hosur (Tamil Nadu) and Seri-Biotech Research Laboratory at Bangalore.

During the year 2018-19, up to the end of September 2018 a total of 12 new research projects have been initiated and 18 projects have been concluded by various R&D institutes of CSB and currently a total of 96 research projects *viz.*, 57 in Mulberry Sector, 30 in Vanya Sector and 09 in Post Cocoon Sector are under progress.

Research & Development (Highlights of Research Programmes)

(i) R&D on Host Plant (Mulberry):

- ❖ Varieties G4 for South, C2038 for East and North regions and Tr-23 for hilly areas of East and North-Eastern zone have been authorized for commercial exploitation.
- ❖ Identified low temperature stress tolerant mulberry genotypes with high leaf yield *viz.*, C-108 (15.4 mt) C-384 (9.7 mt) and C-212 (9.2 mt).
- ❖ Developed C-9, a mulberry hybrid, suitable for low input condition (leaf yield of 49.9 & 34.0 t/ha/yr under full and half of NPK dose vs 44.1 & 26.8 t/ha/yr of S-1635) in West Bengal Condition.
- ❖ C-2028, a water logged tolerant mulberry variety is being popularized in West Bengal, Assam and other Eastern and North Eastern States.
- ❖ Five genotypes C-01, C-384, C-11, C-02 and C-05 used recorded to have better growth traits and leaf yield over check variety S-1635 under West Bengal conditions.
- ❖ Three new mulberry varieties AGB-8, PPR-1 and C1360 (Ganga) have been short listed for testing in the next phase of All India Coordinated Experimental Trials for Mulberry (AICEM).
- ❖ Mulberry is found to sequesterate carbon @ 873 kg/ha/yr under moderate tillage in Eastern India. Similar studies in Southern India is under progress.
- ❖ Identified three putative cold tolerant genes for development of cold tolerant mulberry varieties for temperate regions.
- ❖ The pheromone compounds Z-11 hexadecenal, Octadecane & Z-e-7, 11-hexadecenal acetate were identified to trap male insects of leaf roller (*Diaphania pulverulentalis*). Now EAG as well as synthesis of the pheromone compound under progress.
- ❖ DNA from 110 progenies were extracted to amplify with primers for Nitrogen Reductase and Chalcone Synthase genes.
- ❖ Fusion of protoplasts of four mulberry varieties obtained and callus induced from fused protoplasts.
- ❖ Popularization of the authorized mulberry variety Vishala in Eastern and North-Eastern region is under progress. Vishala recorded 12.21% higher leaf yield i.e 10267 kg/ha/ crop over S1635 i.e., 9150 kg/ha/crop under irrigated conditions in West Bengal.
- ❖ 13719 soil health cards were distributed and 109 soil samples were collected and are being analyzed.

- ❖ The number of mulberry accession being maintained at CSGRC Hosur has been increased to 1291 by adding 55 new collections.
- ❖ “Rot fix” a new formulation was developed against root rot disease with an efficacy of 88-94% disease suppression.
- ❖ Recommended Ankur, a combination of organic and inorganic nutrients as it enhanced mulberry leaf yield by 14% and cocoon yield by 11%.
- ❖ For effective management of mulberry pests, a mulberry pest incidence calendar for different agro-climates of Eastern and North Eastern regions was developed.
- ❖ Field evaluation of “Nemahari”, a bio-nematicide resulted in the reduction of root knot disease up to 80% with an improved leaf yield (15-18%).
- ❖ Surveyed the incidence of root rot diseases in Kashmir regions and identified the causative organism as *Helicobasidium mompa* and *Fusarium oxiforum*
- ❖ Assessing the area under mulberry in major sericulture districts of West Bengal using geo-spatial technique for better management.
- ❖ Field performance of mulberry under different spacing showed that highest yield was in (150+90) cm x 60 cm (13174.83 kg/ha/crop) spacing and minimum in 270 cm x 60 cm (8842.17 kg/ha/crop) spacing.

R&D efforts have helped in improving the mulberry productivity from 50 MT/Ha/yr during 2005-06 to 60 MT/Ha/yr during 2017-18.

(ii) R&D on Mulberry Silkworm:

- ❖ Two new bivoltine hybrids viz., G11xG19 and B.con1 x B.con4 with cocoon yield of 68.5kg/100 dfls and 58 kg/100 dfls respectively were recommended for authorization by Hybrid Authorization Committee. The process of Gazette notification is under progress.
- ❖ Large scale multi-location trial at farmer’s level with MV1xS8 and S8x CSR16 is under progress.
- ❖ N21 x N56, a thermo-tolerant bivoltine double hybrid with yield potential 72 kg/100 dfls & 21.5% shell was selected for limited field trials.
- ❖ Two improved crossbreeds, L3 x S8 and HB4 x S8 tolerant to high temperature and BmNPV and having >90% pupation rate, 20-21% shell ratio and 14-15% raw silk were taken for field trial to validate the yield and thermo tolerant potentials.
- ❖ Four thermo-tolerant silkworm lines were developed utilizing SSR markers (LFL0329 & LFL1123) associated with thermo-tolerance
- ❖ Two bivoltine hybrids tolerant to NPV viz., CSR52N x CSR26N; (CSR52NxS8N)x (CSR16NxCSR26N) have been short listed for further testing in the field.
- ❖ Four hybrids viz., CSR46 x APS9; APS9 x BBE 198; & APS5 x APS9 and SK6 x SK7 were identified for autumn rearing in North India.
- ❖ Two new bivoltine single hybrids namely, BHP-2 x BHP-8 and BHP-3 x BHP-8 developed through shuttle breeding with higher shell percentage over the existing hybrids.
- ❖ Five breeds viz., M.Con.4^{Id} M.Con.4^{Id} M.Con.4^{Id} B.Con.4^{Id} BHB^{Id} developed with Id characters.
- ❖ Full length lipoprotein gene was developed and cloned in *Pichia pastoris* for recombinant protein extraction and characterization.
- ❖ Fortnightly surveys were conducted to monitor the disease incidence in seed and commercial rearing areas of South India.

- ❖ New breeding lines (Oval & Dumbbell lines) were raised from Bulgarian and Indian parents and completed F3 generation.
- ❖ Out of 32 hybrids evaluated under artificial inoculation study for disease response to root rot and root knot infections, Six hybrids have showed resistance response to both the diseases
- ❖ Based on the performance, identified two hybrid crosses ICB14 x N23 and ICB17 x S8 with high productivity and improved silk quality.
- ❖ In order to develop high yielding silkworm breeds, five pure breeds and two hybrids were procured from Bulgaria and are being evaluated for further selection and utilization.
- ❖ Multi-location trial of NPV resistant transgenic silkworm developed through RNAi technique is under progress in South, East and Northern part of India. Transgenic silkworm showed higher NPV resistance as compared to the control.
- ❖ To develop silkworm hybrids suitable to high temperature and humidity regions of southern India, a total of 35 hybrid combinations were short listed and are being evaluated.
- ❖ Rearing of 25 hybrids of silkworm having high temperature and high humidity tolerance under normal and stress conditions completed to short list the best one for Eastern and North-Eastern India.
- ❖ A new Bivoltine silkworm hybrid Gen-3 x SK6 having cocoon yield potential of 50-55 kg yield/100 dfls, and Multivoltine x Bivoltine silkworm hybrid M6DPC x (SK6 x SK7) with 45-50 kg yield/100 dfls were developed for Eastern region.
- ❖ Breeding for developing hardy silkworm breeds for stabilizing the Autumn crop in North and North-Western region is under progress.
- ❖ NPV resistant lines of CSR4 and CSR27 were developed by introgressing the RNAi mechanism from the transgenic silkworm Nistari. These lines of CSR4 and CSR27 showed higher resistance to NPV.
- ❖ Based on the presence or absence of the DNV resistant gene *nsd-2*, three silkworm breeds such as APS-5, APS-HTP5 and BBE198 were identified as DNV resistant.
- ❖ PCR based early detection system for pebrine and NPV has been developed.
- ❖ Field evaluation of the three lines (MASN-4, 6 & 7) of NPV resistant CSR2 silkworm through introgression of NPV resistance has initiated at different agro climatic conditions.
- ❖ Loop-Mediated Isothermal Amplification (LAMP), a simple technique for pebrine detection is being validated at stakeholders level.
- ❖ A simple tool for cocoon de-flossing of cocoons developed and being tested for efficacy.
- ❖ Identified the suitable breeding resource materials tolerant to high temperature and high humidity conditions and prepared the foundation crosses, further breeding work is under progress.
- ❖ 473 silkworm germplasm stocks (81 Multivoltine, 369 Bivoltine and 23 mutants) are being maintained through scheduled rearing.

R&D efforts have helped in improving the yield from 48 Kg/100 dfls during 2005-06 to 60.3 Kg/100 dfls during 2017-18.

(iii) R&D on Vanya Silk:

Vanya Host Plant

- ❖ Identified an alternative food plant *Lagerstroemia speciosa* for Tasar silkworm rearing, which is easy rooter and fast growing. Trials are on to validate the rearing performance.
- ❖ For selecting fast growing drought tolerant *Terminalia arjuna* accessions, 10 superior accessions (Accession No. 102, 115, 123, 135, 424, 507, 523, 525, 614 and 718) selected for further screening.
- ❖ Package developed for moisture conservation and nutrient enrichment of soil in *Terminalia* plantation by incorporating small water catchments at plantation site, wild leguminous plant (*Mucuna bracteata*) and Phosphate Solubilizing Bacteria (PSB). Average increase in leaf yield up to 49.51% was recorded using this package.
- ❖ Two Som accessions (S3 & S6) resistant to leaf spot disease, leaf blight and rust are being popularized in the field.
- ❖ Integrated Nutrient Management (INM) package developed for castor cultivation and it is under field testing.
- ❖ *Ailanthus grandis* (Barpat) has been established as potential perennial food plant of Eri silkworm and recommended for field utilization. It recorded Leaf yield of 32 MT/ha/yr as compare to Kesseru plants leaf yield of 25 MT/ha/yr.
- ❖ Package of practices is recommended for the efficient utilization of Sal flora in Jharkhand and also to improve the Laria productivity on Sal.
- ❖ Biochemical analysis proved similarity in the leaf biochemical of both Castor and *Alianthus grandis*.
- ❖ The *Alternaria ricini* have been isolated in pure form from the infected castor leaves. In bioassay studies antagonistic efficacies of isolate rhizobacteria were tested and isolate LRP-4 and HF-3 showed the maximum inhibition of test pathogen.
- ❖ A total of 64 PSB isolates have been isolated from 10 rhizosphere soil samples of Keonjhar region and in vitro phosphate solubilisation efficiency estimation among these PSB isolates is under progress.

Vanya Silkworm

- ❖ Tasar Daba bivoltine silkworm 'BDR-10' is under popularization.
- ❖ Multi-location field trial for high fecundity Tasar silkworm line, CTR-14 was conducted at five locations. 20-22% gain over control in respect of productive traits was recorded.
- ❖ Two promising lines of Tasar silkworms, DTS and DT-12 selected and 38250 seed cocoons of these lines are under preservation.
- ❖ Eri silkworm breed 'C2' is under popularization.
- ❖ Two superior Muga silkworm lines CMR-1 and CMR-2 are under field testing
- ❖ Muga silkworm eggs preservation schedules developed to facilitate uniform hatching is under field testing.
- ❖ Field trial of eri ecorace SR-025 at semi-arid conditions of Andhra Pradesh is under progress.
- ❖ Based on characterization, evaluation and categorization of wild sericigenous insects, *Antheraea frithi* has been selected as the future prospective species of the NE region.

- ❖ Six promising strains of eri silkworm viz., YP, YS, YZ, GBP, GBS and GBZ have been isolated from Borduar and Titabar ecoraces based on body marking and color. Two combinations viz. YZ x YS and GBS x GBZ are found promising based on rearing performance. One trial grainage of these combinations completed.
- ❖ The *in-situ* conservation for Muga and other wild silk moth's species is being done under NERTPS programme in four states viz., Assam, Meghalaya, Arunachal Pradesh and BTC.
- ❖ Antennal responses of yellow fly with the volatiles extracted from tasar host plant and *Antheraea mylitta* at feeding and spinning stages were studied by using Electroantennogram (EAG).
- ❖ Developed an organic module against pest and diseases of muga silkworm.
- ❖ Pathobiome associated with muga silkworm flacherie disease is established with comparative genomics.
- ❖ The longest embryonic developmental stage has been detected at the ages of 68 to 72 hr. old embryo which helps in developing suitable egg preservation schedules.
- ❖ Field trials of 'Pebrine visualization solution' for easy identification of pebrine spore with light microscopy conducted at different BSMTCs and PPCs of Jharkhand, Odisha, Chhattisgarh Madhya Pradesh
- ❖ Viral & bacterial pathogens associated with flacherie disease in *Antheraea mylitta* D. were isolated & identified.
- ❖ Whole genome of baulovirus causing tiger band disease in *Antheraea proylei* identified (accession:GI 1371952746)
- ❖ A new chemical disinfectant has been formulated for controlling bacterial flacherie disease, caused by *Bacillus* sp. and *Pseudomonas* sp., in muga ecosystem and bioassay studies of the same under laboratory condition is under progress.
- ❖ Trial of Semi-synthetic diet "Tasar Amrit" was carried out at JSDI Ranchi, PPC Kharsawan, PPC Hatgamaria and PPC Bengabad (JH), RTRS Baripada (OD), RTRS Bhandara (MH), REC Kapista (WB) and REC Kathghora (CH).
- ❖ Sericin has been separated from tasar silk fibre waste for its isolation and characterization for commercial utilization. The availability of sericin in different fibre waste is about 1.8-2.5%.

New Breeds/Varieties approved for popularization:

II. Mulberry sector - Host Plants

A. Mulberry varieties authorized recently:

#	New breeds/varieties	Region
1	G4	South zone
2	C2038	Eastern and North Eastern India
3	Tr-23	Hilly areas of Eastern and North Eastern India

B. Mulberry varieties selected for authorization trial:

#	Mulberry varieties	Test areas
1	AGB-8	Southern India under resource constraints
2	C-1360	Eastern and North Eastern
3	PPR-1	Temperate regions of India

II. Mulberry sector - Silkworms

A. Silkworm hybrids recommended for Authorization by Hybrid Authorization Committee (HAC) recently.

#	New breeds/varieties	Region
1	G11x G19	South zone
2	B. con 1 x B. con 4	East and North-East
3	M6DP(C) x (SK6xSK7)	

B. Mulberry Silkworm hybrids selected for authorization test:

#	Silkworm Hybrids	Test areas
1	S8 x CSR16	All Southern states and Maharashtra
2	MV1x S8	All Southern states and Maharashtra
3	SSBS5 x SSBS6	Temperate regions of India

(iv) R&D in Post Cocoon:

- ❖ Development & Demonstration of Indigenous Automatic Silk Reeling Machine (ARM) to produce superior quality import substitute silk.
- ❖ Demonstration of Solar powered low cost spinning machine that can be operated in rural areas by harnessing solar power.
- ❖ “Tasar Plus” – a cooking / softening chemical recipe has been developed for more efficient cooking of Tasar cocoons.
- ❖ Technologies developed for Hot air drying of Tasar cocoons using conveyor hot air drier.
- ❖ Popularization of Low cost eight end multi-end reeling machine for tasar silk reeling.
- ❖ In Vanya silk post cocoon sector Wet reeling of tasar and Muga cocoons, Sizing machine for tasar silk, Modified dry reeling machine for tasar cocoons, Pressurized hank degumming machine and Equipment for recycling of silk reeling water are being popularized in field.
- ❖ Developed a conveyor cocoon drying machine with a capacity of drying 1.2 MT cocoons/day.
- ❖ Developed a new reeling machine “Sonalika” as a replacement for “Bhir” reeling” of Muga cocoons.
- ❖ Demonstration of Pellade extraction and pupa separation machine to remove pellade layer from spent silkworm pupae.
- ❖ Developed technology of “Use of Slug catcher (as replacement for porcelain button) for Slug removing” and is being field tested.
- ❖ Developed technology of “Yarn degumming using CSTR Eco degumming machine” and is being field tested.
- ❖ Vertical Reeling Machine developed by the Institute has been fine-tuned and made 3 ends machine for higher productivity.
- ❖ Developed Mulberry, Tasar, Muga & Eri silk fabric reinforced with fibroin matrix.
- ❖ Developed technology for extraction of sericin from silk yarn using HTHP method.
- ❖ Developed different varieties of Chanderi sarees (Silk x Silk).
- ❖ Developed Mulberry single jersey plain & digitally printed ladies tops

- ❖ Developed Mulberry interlock structure with tie & dye yarn
- ❖ Developed Mulberry & cotton union knits with dye variation as design component
- ❖ Developed Mulberry jacquard tuck knit designs for ladies tops
- ❖ Developed Knits made of mulberry & cotton mélange yarns
- ❖ Eri silk nonwoven fabrics have been successfully prepared and trials on impregnation with cosmetic formulations for face mask application is under progress at L'ORéal.
- ❖ Characterizing the sericin for its utilization in cosmetics (soaps, shampoos, hair creams, etc and as an additive for talcum powder) applications.
- ❖ Technologies developed for Cooking Raily Tasar cocoons for wet reeling.
- ❖ A biofinish has been developed, which enhances the properties of Tasar fabrics in terms of aesthetic and thermo-physiological comfort significantly.
- ❖ Developed technology for development of diversified silk knitwear products/ garments using international quality Indian silk.

R&D efforts have helped in improving the Renditta from 8.2 during 2005-06 to 7.3 during 2016-17.

(v) Patents & Commercialization:

1) During 2017-18

a. Patents obtained:

1. Chemical formulation for cooking Muga Cocoons for higher silk yield
2. Improved handloom using pneumatic lifting mechanism for jacquards
3. Improved reeling cum twisting machine

b. Applications filed for patenting:

1. Applied for patenting of product 'Rot Fix'- A broad spectrum eco-friendly formulation for control of Toot rot disease in Mulberry.

c. Technologies/products commercialized:

1. Commercialized i) ANKUR, an organic and inorganic Nutrient Supplement for Soil Fertility and Health; ii) ANKUSH, an eco-friendly chemical formulation for silkworm body and rearing seat disinfectant and iii) Rot fix, a broad spectrum eco-friendly formulation for control of Root Rot disease in Mulberry.

(vi) Collaborative Research Projects and Biomaterial Research:

- 1) The R&D institutes of CSB, in addition to the in-house funded projects, are also carrying out collaborative research projects with the financial assistance from DBT, DST, MNRE etc. During 2018-19, a total of 17 research projects with external funding are being carried out.
- 2) CSB Institutes also collaborate with other research Institutes such as IIT Kharagpur, IIT, Guwahati, IARI New Delhi, IIHE, Bangalore, CCMB Hyderabad, IISc, Bangalore, BTRA Mumbai, GKVK Bangalore, ICAR-NBAIR, Bangalore, NESAC, Shillong, NEIST Jorhat, NBSS & LUP, Jorhat, RFRI, Jorhat, BIT Mesra, NCL Pune, etc. At present, 09 such projects are being carried out in collaboration with some of these institutes.

- 3) International collaboration with different institutes has also been undertaken. Three projects with Deakin University, Australia for developing technology on post cocoon technology are being carried out. A project with a Research Institute in Bulgaria on breed improvement is being carried out and another project on molecular characterization of Ifla virus infecting tasar silkworm with Swedish Research Council has just been initiated.
- 4) MOU has been made with research institutions in Bulgaria, Japan, China, and Australia for exchange of Genetic material to improve hybrid vigor.

Training

The R&D institutions of CSB, spread across the country, covering all activities on the silk value-chain pertaining to all the four silk sub-sectors, are intensively involved in training, skill seeding and skill enhancement on a sustainable basis. CSB's capacity building and training initiatives have been restructured under the following five heads:

(i) Skill Training & Enterprise Development Programmes (STEP):

Under this category a variety of short-term training modules focusing on Entrepreneurship development, In-house and industry Resource Development, Specialized Overseas Training, popularization of sericulture technologies, lab to land technology demonstration programmes, training impact assessment surveys etc. have been planned. Some of the popular programmes under this component are: Entrepreneurship Development Programme, Technology Up-gradation Programme, Resource Dev. Programme / Trainers Training Programme, Competency Enhancement Training Programme, Disciplinary Proceedings Training, Management Development Programme etc.

(ii) Establishment of Sericulture Resource Centre (SRC):

SRCs are training cum facilitation centres established in select Mulberry Bivoltine & Vanya clusters with a unit cost of Rs.2.00 lakhs each to act as an important link between Extension Centres of R&D labs and the beneficiaries. The purpose of these SRCs is - technology demonstration, skill enhancement, one-stop shop for Seri-inputs, doubt clarification and problem resolution at cluster level itself. As on date 23 SRCs are functioning.

(iii) Capacity Building & Training by R&D Institutes of CSB:

In addition to conducting structured long-term training programme (Post Graduate Diploma in Sericulture & Intensive Sericulture Training) the R&D institutes of CSB and also conduct technology-based training both for farmers and other stakeholders besides organizing Krishi Melas, Farmer's day, farmer's interaction workshops etc. for empowering the framers and other industry stakeholders.

(iv) Capacity Building in Seed Sector:

Silkworm seed is the most critical sector that drives the entire silk value chain. The quality of seed determines the quality of industry output. Therefore addressing the capacity building and training needs of this sector is of paramount importance. It is proposed to conduct a variety of training programmes to cover industry stakeholders like - Pvt. Silkworm Seed

Producers, Adopted Seed Rearers, Managers and work force attached to Govt. owned grainages.

(v) Information, Education and Communication (IEC):

IEC is meant for supporting Capacity Budding and training initiatives by popularizing recommended technologies through Brochures, pamphlets, handouts, booklets etc. This component also propose to produce technology based instructional videos, study materials and documentary films to show case the industry. During September 2017 a total of 1500 copies of Handbook on Silk Industry in India (Info Booklet) have been got printed through Publicity Section.

Table below shows details of number of persons trained under programmes organized by the Research & Training Institutes of CSB during the years 2016-17, 2017-18 and current financial year 2018-19 till Sept-18 is given below:

#	Training courses	No. of persons Trained					
		2016-17		2017-18		2018-19	
		Target	Achmt.	Target	Achmt.	Target	Achmt. (Till Sept-18)
1	Structured Courses (PGDS, Mulberry & Non-Mulb. Courses)	100	111	265	216	230	56
2	Farmers Skill Training, Technology Orientation Programmes, Capsule & Adhoc Courses and Exposure Visit	9400	9034	8030	8853	8,290	1,436
3	Other Training Programmes	4000	6628	4945	6322	3,045	2,454
4	STEP	1500	917	2030	1901	1,260	242
	TOTAL	15000	16690	15270	17292	12,825	4,188

Transfer of Technology (TOT):

The technologies emanated out of the concluded projects are being effectively transferred to the field through various extension communication programmes viz, Krishimelas, Group Discussions, Enlightenment programmes, Field Days, Farmers’ Meet, Audio Visual programmes, Technology demonstrations etc. During 2018-19, up to the end of September 2018, a total 506 ToT programmes have been organized and 38 technologies were transferred effectively to the user level under pre-cocoon sector. Further, in post cocoon sector a total of 114 field programmes/ technology demonstrations were conducted and 57,848 cocoon and silk samples have been tested and provided the results.

(i) Implementation of Cluster Promotion Programme for Bivoltine silk:

During XII Plan, the foremost thrust is to augment the import substitute silk in the country and to increase the production of BV silk to 5000 MT from the production level of 1985 MT (2012-13). To achieve the target, Central Silk Board in association with State Sericulture Departments has organized 172 Bivoltine Clusters.

With the joint concentrated efforts, 5874 MTs of Bivoltine raw silk has been produced against Country’s target of 6200 MTs during 2017-18 (11.5 %

increase over 5266 MT produced in 2016-17). Bivoltine clusters contributed 4100 MT (70.0%) out of the country's total BV raw silk production of 5874MT.

Cluster Promotion Programme is being continued from 2017-18 to 2019-20 mainly to focus on enhancing the Country's bivoltine raw silk production target of 8500 MT at the end of 2019-20. While restructuring/reorientation of some of the existing clusters of Northwestern region for effective monitoring purpose the total number of clusters were brought down to 151 clusters from the existing 172 clusters without effecting the total cluster target. It is anticipated to produce 4900 MT of bivoltine raw silk, from 151 clusters during 2018-19 which contributes about 68% of total production target of 7200 MT. During 2018-19 (April to Sept-2018) the total BV raw silk production stands at 2872 MT out of which clusters contributed 1720 MT (60%).

(ii) Implementation of Cluster Promotion Programme for Vanya silk:

To promote Tasar silk sector, Central Silk Board has established 22 vanya clusters in coordination with State Governments through cluster approach in 9 tasar producing States. Under this programme a total of 2792 beneficiaries were covered under Capacity Building, exposure visit, door to door supply of disinfectants and awareness programmes conducted on technology transfer service. A total of 1.997 lakh dfls were brushed by 960 Adopted Seed Rearers in first seed crop (1st crop) and produced 70.89 lakh seed cocoon @ 35.5 cocoons /dfl. These seed cocoons were processed by 165 Private Graineurs to produce 7.57 lakh dfls, of which 6.79 lakh dfls were reared by 2627 commercial farmers in second crop (commercial) and produced 266.74 lakh cocoons @ 39.72 cocoon/dfls in the clusters. Remaining 0.78 dfls were supplied to commercial farmers outside the clusters.

(iii) Japan Overseas Cooperation Volunteers (JOCV) under JICA:

CSB in association with JICA has taken up many programmes, since 1991 for sustainability of Bivoltine in India. CSB under phase-1 of JICA programmes has developed suitable Bivoltine Breeds, Mulberry varieties and a comprehensive Bivoltine Sericulture Technology package suitable for multiplication/ replication to Indian Conditions. These technologies were field tested during second phase of the programme and during third phase a comprehensive Extension System was developed. The same is under multiplications in India through CPP and achieved production of 5200 MTs of Bivoltine Silk by end of XII plan against a target of 5000 MT.

During 2012-14, under JICA Follow-up cooperation programme, JICA has recommended to strictly follow one way multiplication of basic seed for quality maintenance and adopt JICA recommended technology for race maintenance to maintain the race characters and also recommended to strictly use Rotary mountages Technology with net collection techniques for quality silk production. On Post Cocoon Sector, with JICA support, an indigenous made Automatic Reeling Machine has also been developed and efforts have been made to improve it through induction of Harada water Ejection System with the help of JICA Experts.

For sustainable growth of Bivoltine silk, in addition to the Cluster approach, efforts have been made to introduce Community Based Organizations (CBOs),

Self Help Groups (SGHs) amongst the farmers to carry out knowledge /technology transfer amongst the farmers, beside the existing extension activities i.e. Group activities, credit facilitations, thrift and better price realizations. To supplement our efforts JICA had deputed 3 Japan Overseas Cooperation Volunteers (JOCV) under JOCV programme to work in association with CSB/DoSs CDFs in 10 clusters (8 in Karnataka, Andhra Pradesh & Tamil Nadu and two in Uttarakhand) three years from January 2015. The main objective of JOCVs are to support CSB/State Counterparts in Bivoltine Clusters to identify the field problems, assist in Extension methodology in organizing Self Help Groups/CBOs involving sericulturists for effective technology transfer identified Clusters. Three JOCVs have completed their assignment on March 2017 and expected their replacement shortly. The JOCV programme is extended up to December 2020.

I.T. Initiatives:

- ❖ **DBT MIS:** Development of DBT MIS for the scheme "Development of Silk Industry" is completed and submitted for security audit by STQC, STQC has completed round 1 of audit and submitted their observations, which were fixed and submitted for 2nd round audit.
- ❖ **mKisan:** CSB has widened the outreach of scientists and experts to disseminate information to provide scientific advisories to farmers through their mobile phones using mKisan Web Portal. All the main institutes are regularly providing advisories thru this portal.
- ❖ **'SMS service'** through mobile phone on day-to-day market rates of Silk and Cocoons for the use by the farmers and other stakeholders of the industry. Both PUSH and PULL SMS services are in operation. Mobile numbers received from DOS are updated and all the registered 7794 farmers are receiving SMS messages on daily basis.
- ❖ **SILKS Portal:** Sericulture Information Linkages and Knowledge System portal has been developed in association with North Eastern Space Application Centre, Dept. of Space by capturing geographical images through satellite and used for analysis and selection of potential areas for promoting Sericulture activities in those areas. Multi lingual, multi district data is being updated regularly.
- ❖ **Video Conference:** CSB has fully fledged Video Conference facility at CSB Complex, Bangalore, CSR&TI, Mysore & Berhampore, CTR&TI, Ranchi, CSR&TI, Pampore, CMER&TI, Lahdoigarh and RO, New Delhi. From 1st April 2018 to 30th Sep 2018, 21 multi-studio Video conferences are conducted.
- ❖ **CSB website:** Central Silk Board has a website "csb.gov.in" in bi-lingual English and Hindi. Maximum information is disseminated through this portal for the benefit of common citizen, who may need to know about the organisation as well as schemes and other details. Publicity of sericulture plan programmes, achievements and sharing of success stores are featured in the website. CSB has initiated steps to make CSB website GIGW compliance and security audited as per Govt. of India guidelines.
- ❖ **AEBAS:** Aadhaar enabled bio-metric attendance system is being implemented at Central Silk Board. Over 4226 employees including farm workers have registered into the attendance portal. All the 121 devices are

RD Services enabled. Due to re-structuring of CSB, nearly 450 employees have been shifted to different units; updation of the same is in progress.

- ❖ **Windows based Accounting Software:** Successfully converted DOS based FAS/PRS package into windows based FAS/PRS with additional user friendly features. Implementation of the same in all the delegated units of CSB are in progress. This has facilitated implementation of PFMS smoothly obtaining data from FAS/PRS.
- ❖ **National Database for farmers and reelers:** Farmers and Reelers data base is designed and developed to have database of Farmers and Reelers at national level, which will help policy makers with appropriate information for effective decision making. As on 30th Sep 2018 6,41,651 farmers and 9845 reelers details have been recorded by the states in the database.
- ❖ **MIS ON NERTPS "INTENSIVE BIVOLTINE SERICULTURE DEVELOPMENT PROJECT IN NORTH EAST STATES":** MIS for Intensive Bivoltine Sericulture is developed and hosted on dedicated servers for trouble free access by all stake holders.
- ❖ **Digitization of Pension Records:** Software designed and developed for digitization of pension papers. All the pension records were digitized for security, safety and ease of management.
- ❖ **BPO for interacting with FRDB farmers:** Nodal officers of each zone are interacting with selected farmers obtaining their mobile numbers from FRDB database on regular basis.
- ❖ **Development of Mobile App on Silk Samagra:** Designing and data gathering is in progress.

2. SEED ORGANISATION

The CSB has a chain of Basic 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.

The Table below indicates the total quantity of seed production during the year 2016-17, 2017-18 and current financial year 2018-19 till Sept-18:

(Unit: Lakh dfls)

Particulars	2016-17		2017-18		2018-19	
	Target	Achmnt.	Target	Achmnt.	Target	Achmnt. (Till Sept-18)
Mulberry	390.00	430.10	440.00	388.35	450.32	201.14
Tasar	47.43	48.60	51.08	52.81	51.66	25.94
Muga	8.13	6.87	8.07	7.08	8.43	1.87
Eri	5.5	4.78	6.00	6.88	6.00	3.40
Total	451.06	490.35	505.15	455.12	516.41	232.35

3. COORDINATION AND MARKET DEVELOPMENT.

Central Silk Board administration includes Board Secretariat, Regional Offices, Certification Centers and Raw Material Banks. The Board Secretariat of CSB monitors the implementation of various schemes and coordinates with Ministry

and States in implementation of various projects in sericulture sector. Several National meetings, Board meetings & Review meetings and other high level meetings are being carried out by the Board Secretariat. The Raw Material Banks operate floor price to stabilize the market price of cocoons to ensure remunerative price to primary producers.

Raw Material Bank (RMB) for Tasar at Chaibasa (Jharkhand) and Muga Raw Material Bank (MRMB) for Muga (presently merged with Regional Sericulture Research Station (RSRS), Jorhat) in Assam are functioning with the primary objective of ensuring economic and fair price to the actual Tasar & Muga cocoon producers.

The details of procurement and sale made by RMB & MRMB and its Sub-depots during 2016-17, 2017-18 and current financial year 2018-19 till September-18 are given below:

(Unit : Qty.in lakh Nos. & Value in Lakh Rs.)

Year	RMB (Tasar)				MRMB (Muga)			
	Procurement		Sale		Procurement		Sale	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
2016-17	200.76	287.10	171.68	229.88	1.55	2.77	1.55	2.92
2017-18	158.18	180.78	157.65	225.32	1.59	2.32	1.59	2.43
2018-19 (Till Sept-18)	41.23	52.47	41.81	76.73	1.79	2.73	1.70	2.68

PRODUCT DESIGN, DEVELOPMENT AND DIVERSIFICATION (P3D)

The activities under P3D are to give special focus on fabric engineering, silk blends, designing new fabric structures, design and development of new products in silk and silk blends, product development in the clusters, commercialisation of developed products, assisting the commercializing partners in providing backward linkage, technical know-how and assisting/coordinating in sample development.

Activities of P3D:

- Revival of Traditional silk Products
- Design development and diversification of products with blends
- Product development based on certain identified preferences and requirement in terms of both their design and end uses
- Generating market information, updating market data and forecasting fashion trends.
- Generic and Brand promotion of Indian Silks by organising theme pavilions and display of products in silk expos /exhibitions.
- Assist silk manufacturers and exporters in development of innovative designs and fabrics in tune with the market demand.
- Display of latest developments in silk products and ultimately to create a Centre of excellence for innovations in Indian Silks.

Products Developed:

1. Muga Satin fabric on power loom and Garments
2. Eri silk denim fabrics for Blazer and garments, Eri and Mulberry knits, Eri silk blanket and carpet & Eri silk thermal wear.

3. Tasar silk fabric on power looms for bridal dress.
4. Pure silk sarees and Fabrics in Chanderi cluster
5. Kanchipuram sarees with ,Muga silk in designing
6. Stain guard and Aroma treated sarees
7. Silk life style products – Ladies purse,bags, socks, glouse, accessories
8. Silk sarees /fabrics printed in Bagh (MP) cluster
9. Products with traditional Lambani art work
10. Mulberry X Eri sarees with Bomkai Design
11. Mulberry saree with Nagaland tribal motif and Silk /linen, silk / cotton, silk / modal fabrics

4. QUALITY CERTIFICATION SYSTEM, EXPORT BRAND PROMOTION & TECHNOLOGY UPGRADATION

One of the main objectives of the Quality Certification Systems is to initiate suitable measures towards strengthening quality assurance, quality assessment and quality certification. Under the scheme, two components viz. “Cocoon and Raw Silk Testing Units” and “Promotion of Silk Mark” are being implemented. Quality of cocoons influences the performance during reeling and quality of raw silk produced. Cocoon Testing Centres which have been established in different Cocoon Markets with the support under CDP facilitate cocoon testing. The network of Certification Centres of Central Silk Board attached to the Regional Office carryout voluntary pre-shipment inspection of silk goods meant for export to ensure quality of silk goods exported from India. Besides, Central Silk Board is popularising “Silk Mark”, for purity of silk products through the Silk Mark Organisation of India (SMOI). “Silk Mark”, an assurance label, protects the interests of the consumers from the traders selling artificial silk products in the name of pure silk.

The progress achieved under the Silk Mark Scheme during 2016-17, 2017-18 and current financial year 2018-19 till Sept-18 is given below:

Particulars	2016-17		2017-18		2018-19	
	Target	Achmnt	Target	Achmnt	Target	Achmnt (Till Sept-18)
Total No. of new Members enrolled	250	254	250	271	250	158
Total No. of Silk Mark Labels sold (Lakh nos.)	25.00	25.53	27.50	23.94	27	13.71
Awareness Programmes/ Exhibition/ Fairs/ Workshop/ Road shows	410	622	450	553	480	187

(i) Silk Mark Expos

In order to ensure that Silk Mark gains further credibility & popularity, Silk Mark Expos are being organized exclusively for Silk Mark Authorized Users from across the country. The Expo is an ideal platform not only to popularize Silk Mark but also in bringing the manufacturers and the consumers under one platform for selling and buying of pure silk products. Substantial business for the participants is generated during this event. During the event massive awareness and publicity campaigns are carried out by the SMOI.

During the year 2018-19 (from April to September 2018), in view of the sluggish market for silk products and lukewarm response from the Authorised Users, SMOI has organised four Silk Mark Expo at the following places.

	Description	04 th to 08 th April 2018 5 days	20 th to 25 th July 2018.. 6 days	26 th August to 02 nd September 2018... 8 days	5 th to 9 th September 2018. 5 days	Cumulative
#	Place	NEFDi House, Dispur, Guwahati	Rena Event Hub, Banerjee Road, Kaloor, Kochi, Kerala	Jyoti Bibah Bhawan, Chowkidingee, Dibrugarh, Assam	NEDFi House, Guwahati, Assam	--
1	No. of stalls	42	44	23	43	152
2	No. of AU s	42	43	23	43	151
3.	No. of states	8	11	8	7	11(max)
4.	No. of Visitors	10000	7800	8000	8000	33800
5.	Business turn over	1.50 Crs.	1.45 Crs	0.60 Crs	1.00Crs	4.550 crs

In recent time due to higher stall rent, Authorised Users are reluctant to participate in the Silk Mark Expos and to offset this, SMOI is exploring the possibilities of organizing Silk Mark special handloom Expos in association with Development Commissioner (Handlooms). D C (H) has in principle approved for providing financial assistance for 3 expos at Pune, Hyderabad and Vizag. Further action is being taken to explore the possibilities of conducting Expos at different cities in coming months.

Some of the promotional activities undertaken during the period are:

1. The Kerala state government has organised “NAVKERALAM 2018” a grand Exhibition at stadium ground Palakkad, from 21-05-2018 to 27-05-2018 for 7 days. The exhibition was inaugurated by Hon. Chief Minister Shri. PINARAYI VIJAYAN on 21.05.2018. SMOI Palakkad chapter arranged a theme pavilion, in 100 sq. ft., stall space displaying all the activities from Soil to finished products in the Silk chain including the live demonstration of life cycle of silk worms, samples of different varieties of silk products. One small Handloom was arranged in the stall to demonstrate the technique of handloom fabric weaving to the public. This is very much attracted the public.
2. Hyderabad chapter has conducted Curtain Raiser of Srimathi Silk Mark 2018 in the premises of Department of Sericulture, Jubille Hills, Hyderabad to promote and bring awareness about Silk Mark among the consumers. Chief Guest Smt.C.S.Ramalakshmi, IFS (Retd.) & Smt. Shailja Reddy 2nd runner up of Srimathi Silk Hyderabad 2017 addressed the press conference about the process of 6th Edition of Hyderabad Srimathi Silk Mark 2018 and advantages of participating and emphasized the importance of Silk Mark. Smt. Sharavani Reddy, Industrialist and Smt. Indira, Social Worker also addressed the media about 6th edition of Srimathi Silk Mark 2019 registration criteria, terms and conditions. Further, the press conference was attended by media personnel and it has been widely covered in both Print and Electronic media.

3. The SMOI, Hyderabad chapter has conducted grand sixth version of Srimathi Silk Mark -2018 on 21st April 2018 at Kalinga hall, Banjara Hills, Hyderabad. It is a mega event attended by more than 400 peoples from all walks of life like General public, students & faculty from NIFT, ATDC, CSB officers & Staff, eminent Public and Private personalities. The jury comprising of eminent personalities judged the participant's ability, knowledge about silk and silk mark and finally selected the 3 finalists & the winners based on their performance. A cultural programme and a ramp walk by models depicting the recent developed silk products by P3D, VSMPC.
4. Based on the tremendous response to the Resham Ghar – A home of pure Indian Silks, started on an experimental basis in New Delhi, in collaboration with Lepakshi, Hyderabad, it was decided to start a similar venture in Bengaluru as well. M/s. Central Cottage Industries Corporation was approached in this connection to provide space for the 'Resham Ghar' in their showroom at M.G.Road, Bengaluru.
Six Authorised Users of Silk Mark from Karnataka, Telangana, Jharkhand, West Bengal, New Delhi and Assam have been provided stall space in the Resham Ghar @ CCIC. It was inaugurated by Shri. K.M.Hanumantharayappa, Chairman CSB & SMOI and Shri. R.R. Okhandiar, Member Secretary, CSB & Vice Chairman, SMOI on 11th June, 2018. After inaugurating the Resham Ghar, the dignitaries also took keen interest to see the silk products on display for sale by the Authorised Users of Silk Mark. SMOI in coordination with CCIC, is in the process of setting up one each Resham Ghar at Kolkata and Chennai.
5. SMOI, Bangalore chapter has organized Flower Show from 4th to 15th August for 12 days in the Glass House, Lalbagh, Bangalore. A theme pavilion depicting 3 Silk Mark logos & Silk Mark India have been decorated with flowers and silk moth emerging from cocoon were displayed for the promotion of Silk Mark. The colour combinations of the flower chosen were very attractive, bright & apt for the occasion and decked up neatly presenting a pleasant look to the visitors. The flowers were replaced with fresh ones once in four days and lakhs of people visited and appreciated the efforts of SMOI. It is a noticeable thing that a number of peoples were seen taking selfies in front of the Silk Mark butterfly flowers. It is estimated that more than 3 lakhs peoples visited the flower show.
6. As a part of Swachata Abhiyan, SMOI Corporate Office has organised street plays 3 nos. each at Lalbagh, Bangalore on 29th September and at Cubbon Park on 30th September 2018. The main theme of these street plays is to focus on cleanliness drive and creating awareness among general public about usage of bio degradable containers for the daily use. These plays attracted the attention of a huge public crowd.

5. FINANCIAL PROGRESS

The table below indicates year-wise financial performance of the Central Silk Board during the years 2016-17, 2017-18 and current financial year 2018-19 till Sept-18:

(Cr. Rs.)

BUDGET HEADS	2016-17		2017-18		2018-19	
	Allocation (RE)	Expnd.	Allocation (RE)	Expnd.	Allocation (Approved BE)	Expnd. (Till Sept-18)
Administrative Expenditure	342.50	342.50	381.00	381.00	380.61	239.98
Scheme Outlay- for Silk Samagra	154.01	154.01	161.50	161.50	120.00	52.19
Total	496.51	496.51	542.50	542.50	500.61	292.17

6. OTHER SCHEMES

A. CONVERGENCE EFFORTS:

The Ministry of Textiles is extending support to the sericulture sector in the form of CSS & NERTPS. Efforts are taken for further by mobilizing additional funds through convergence, by availing the schemes being implemented by various other Ministries of Govt of India. As per the latest reports received from States, during the year 2017-18, against the proposals of States for Rs. 935.92 crores for 257 projects, the States have received sanction for Rs.799.17 crores for 179 projects, of which Rs. 603.16 crores has been released for various sericulture activities under RKVY, MGNREGA and other convergence programmes. For the year 2018-19 (till Sept-18), States have submitted 81 proposals for Rs. 695.02, of which 69 proposals worth Rs. 556.23 crores have been sanctioned and Rs. 105.54 crores released to States.

B. MAHILA KISAN SASHAKTIKARAN PARIYOJANA (MKSP):

Building on the successful models developed under special SGSY Projects in Bihar and Jharkhand for replication, CSB and MoRD took up multi-state ventures involving Society for Elimination of Rural Poverty, Govt of Andhra Pradesh (SERP), Bihar Rural Livelihood Promotion Society (BRLPS)), Govt. of Bihar, PRADAN, BAIF and Kovel Foundation under the Mahila Kisan Sashatikaran Pariyojana (MKSP) – Non-Timber Forest Produce (NTFP), a subcomponent of National Rural Livelihood Mission (NRLM). The seven projects envisage covering 36117 mahila kisans (26094 in tasar sector) from 23 districts in 8 states at an outlay of Rs. 71.60 crores shared by MoRD and CSB (75:25). The project envisage to raise 3503 ha of tasar host flora, rejuvenation of 9468 natural tasar flora, to establish capacities to produce 6.75 lakh dfls of basic seed, 59.35 lakh dfls commercial seed & 16.09 crore reeling cocoons besides nurturing 478 CRPs for upscaling programmes.

Financial Progress: MoRD has released Rs. 29.34 crores to CSB under multi state project of which Rs. 29.023 crores has been released to the PIAs, who have utilized Rs.23.74 crores. CSB has also released Rs. 15.946 crores (CDP share) to all the PIAs including SERP, of which Rs.14.36 crores has been utilized. Except in AP where the project has been discontinued by the PIA, entire CSB share released under the project.

Physical Progress: 32482 farmers were covered (79.38%-ST, 5.06%-SC and 14.19% minorities) in 828 hamlets, 700 revenue villages, 62 blocks and 27 districts of the Project states. Under the projects, 1520.8 ha. of block plantations were raised by 2497 farmers. 1620 seed rearers brushed 10.695 lakh dfls of basic seed procured from BTSSO and BSPUs, to produce 296.21

lakh seed cocoons @ 27.70 seed cocoons per dfl. 306 nucleus seed rearers brushed 1.524 lakh dfls of nucleus seed to produce 73.42 lakh seed cocoons @ 48.20 seed cocoons per dfl. 328 private graineurs processed 201.531 lakh seed cocoons and produced 49.04 lakh commercial dfls @ cocoon:dfl ratio of 4.1:1 and 12917 commercial rearers brushed 49.92 lakh dfls procured from the private grainages, to produce 1383.96 lakh reeling cocoons @ 31.71 cocoons per dfl.

Scaling up projects under MKSP by State Rural Livelihood Missions (SRLMs) with support of CSB as NRLM Support Organization (NSO)

As per the decisions taken during the Stakeholders' Meet by the Hon'ble Union Minister of Textiles at New Delhi on 10.02.2017 and also CSB being the National Rural Livelihood Mission (NRLM) Support Organization [NSO] of MoRD will be supporting the State Rural Livelihood Missions (SRLMs) in project formulation, implementation (designing technical protocol, value chain studies, project documentation) and capacity building (preparation of training modules, exposure on tasar cultivation to the livelihoods anchor persons of SRLMs) etc., wherever specific requests are made.

CSB also represented the Empowered Committee (EC) of MoRD to consider Annual Action Plans (AAPs) under Mahila Kisan Sashaktikaran Pariyojana (MKSP) tasar based interventions from the states of Jharkhand, Odisha and West Bengal on 1.3.17. These projects covering 35220 Mahila Kisans at an outlay of Rs.63.34 crores have been approved, as per letter no.K-11034/02/2017/MKSP/EC dt 3.3.17. Besides, CSB supported SRLMs of Chhattisgarh and Bihar to finalize the tasar proposals, which are under consideration of MoRD. About 50,000 mahila kisans will be supported at an outlay of Rs.89.43 crores, during the period 2017-20 with funding from MoRD(60%) and SRLMs (40%) with technical support from CSB, wherever SRLMs requests. Coverage and outlay of the above projects is detailed below:

(Rs. in lakhs)

State	No. of beneficiaries	MoRD share	SRLM share	Total
Jharkhand	25000	2792.835	1861.89	4654.725
Odisha	5220	513.57	342.38	855.95
West Bengal	5000	494.191	329.461	823.652
Approved	35220	3800.596	2533.731	6334.327
Chhattisgarh	10448	1118.504	745.669	1864.173
Bihar	3795	446.7304	297.8203	744.5506
In pipeline	14243	1565.234	1043.489	2608.724
Total	49463	5365.83	3577.22	8943.051

C. SCHEDULED CASTE SUB-PLAN (SCSP)

The Ministry of Textiles, Govt. of India has sanctioned an amount of Rs.25.00 crores towards implementation of Scheduled Caste Sub-Plan (SCSP) under sericulture during the year 2018-19. So far, an amount of Rs.6.18 crores has been released to Andhra Pradesh, Telangana, Tamil Nadu, Uttar Pradesh, Uttarakhand & Himachal Pradesh towards implementation of components

under SCSP during the year 2018-19. A total number of 989 beneficiaries have been covered.

D. TRIBAL SUB-PLAN (TSP)

The Ministry of Textiles, Govt. of India has sanctioned an amount of Rs.15.00 crores towards implementation of Tribal Sub Plan (TSP) under sericulture during the year 2018-19. So far, an amount of Rs.3.72 crores has been released to Andhra Pradesh, Tamil Nadu, Jharkhand & Himachal Pradesh towards implementation of components under TSP during the year 2018-19. A total number of 1595 beneficiaries have been covered.

E. SERICULTURE DEVELOPMENT IN NORTH-EASTERN STATES

North East being a non-traditional area for Sericulture, Govt. of India has given special emphasis for consolidation and expansion of Sericulture in all the North Eastern States with critical interventions from host plantation development to finished products with value addition at every stage of production chain. As a part of this, under NERTPS - an Umbrella scheme of Ministry of Textiles, the Govt. of India have approved 32 Sericulture projects in all North Eastern States in the identified potential districts under two broad categories viz., Integrated Sericulture Development Project (ISDP) and Intensive Bivoltine Sericulture Development Project (IBSDP).

On-going projects:

A total of 24 projects have been approved covering Mulberry, Eri and Muga sectors in all NE States. With a cost of Rs.822.94 crore having GoI share of Rs.693.76 crore for implementation from 2014-15 to 2018-19. Objectives of these projects are to establish sericulture as viable commercial activity in NE by creating necessary infrastructure and imparting skills to the locals in silkworm rearing and allied activities in entire silk production value chain. The projects aim to bring 31,010 acres (existing - 18,331 acres and new - 12,679 acres) of plantation under Mulberry, Eri and Muga sectors with supporting critical interventions to the stakeholders. The projects are expected to contribute an additional production of 2,285 MT raw silk during the project period and 1,100 MT silk per annum after the project period involving 46,094 families thereby enhancing the total production of silk from NE to 9,238 MT in 2019-20 from the level of 4,602 MT in 2013-14. These projects have been approved in PAMC meetings held from 2013-14 to 2016-17. Upto September 2018, about 30,622 acres (existing 18,331 acres and new 12,291 acres) have been brought under host plantation of Mulberry, Eri and Muga covering 40,966 beneficiaries with total raw silk production of 2,239 MT. As against Rs.616.34 crore released by Ministry of Textiles, an expenditure of Rs.508.94 crore (83%) has been incurred by all the NE States.

Newly approved projects:

Considering potentialities for sericulture development in NE, Ministry of Textiles has approved 8 new projects including establishment of 3 Eri Spun Silk Mills and 2 projects on aspirational Districts in NE, with a total project cost of Rs.169.10 cr, of which GoI share is Rs.155.25 cr to cover 12,221 beneficiaries resulting in production of 187 MT of silk during the project period covering 2,600 acres of plantation from Mulberry, Eri and Oak Tasar sectors and 3 new Eri spun silk mills to produce 165 MT of Eri spun silk yarn per annum.

The summary of overall Sericulture projects being implemented under NERTPS is given in the Table below:

#	State	Total Project cost (Rs. cr.)	Gol share (Rs.cr.)	Funds released	Beneficiaries (Nos)		Raw Silk during project (MT)	
				(Rs. cr.)	Target	Achmt	Target	Achmt(P) (till Aug. 2018)
Ongoing Projects								
1	Assam (2 Projects)	96.22	73.69	62.44	7,109	7,109	225	319
2	BTC (4 Projects)	131.75	115.15	95.21	8,724	7,543	501	417
3	Arunachal (2 Projects)	47.89	44.62	42.39	4,219	2,322	99	23
4	Manipur (2 Projects)	180.15	151.27	128.05	8,782	6,440	518	568
5	Meghalaya (2 Projects)	59.16	47.68	44.05	3,900	3,889	188	224
6	Mizoram (3 Projects)	76.16	64.2	60.99	3,685	3,379	160	141
7	Nagaland (4 Projects)	83.12	70.13	62.53	5,275	4,823	265	267
8	Sikkim (1 Project)	29.68	26.43	25.11	1,094	885	27	9
9	Tripura (3 Projects)	81.09	62.87	57.75	4,576	4,576	302	272
10	CSB Seed Infra (1 Project)	37.71	37.71	35.82	-	-	-	-
	IEC	-	-	2	-	-	-	-
	Sub Total (24 Projects)	822.94	693.76	616.34	47,364	40,966	2,285	2,239
Newly approved projects:								
1	Assam (1 Project)	21.53	19.09	-	2,500	-	55	-
2	BTC (2 Projects)	40.16	36.44	-	3,900	-	100	-
3	Arunachal (1 Project)	37.25	35.65	-	1,270	-	86	-
4	Manipur (1 Project)	21.53	19.09	-	2,500	-	55	-
5	Mizoram (1 Project)	11.56	10.82	-	650	-	20	-
6	Nagaland (2 Projects)	37.08	34.17	-	1,401	-	36	-
	Sub Total (8 Projects)	169.11	155.27	-	12,221	-	352	-
	Grand Total (32 Projects)	992.05	849.03	616.34	59,585	40,966	2,637*	2,239

P: Provisional * Out of 2637 MT, 165 MT is Spun Silk Yarn

SUCCESS STORIES IN SERICULTURE:

1. Shri M. Nagarajappa S/o. Shri Muniyappa, Village: Venugopalapura, Taluk: Bangarpet, District: Kolar, Karnataka has been practising sericulture since 2000. He takes up silkworm rearing with BV and CB hybrids during different seasons generating more than 1600 kg of quality cocoons out of 2000 dfls from his 1.5 acre mulberry (V1) plantation with a yield of 80 kg cocoons per 100 dfls. He has adopted an innovative 'tree plantation/krisi Honda

irrigation system' with assistance under the Krushi Bhagya scheme of the State Government that helped him in productivity improvement by 50% more per 100 dfls and reduction in the labour cost. His average income is Rs.1.68 lakh per year.

2. Shri Yashwant S/o. Late Kodu, Village: Salhe, Taluk: Lalburra, District: Balaghat, Madhya Pradesh has been practising sericulture since last 10 years. He takes up silkworm rearing with bivoltine hybrids, harvesting more than 355 Kg. of quality cocoons out of 700 dfls from his 1.0 acre mulberry plantation with a yield of 50 Kg. cocoons per 100 dfls. He has availed CDP assistance for construction of rearing house, bivoltine rearing equipment and irrigation facility. He has adopted innovative sprinkler system over roof of rearing house that helped him in getting 30-40% higher yield per 100 dfls. His average income is Rs.1.00 lakh per year.
3. Shri Thangjam Umakanta Luwangcha S/o. Shri Thangjam Shamungou, Village: Yumnam Khunou, District: Imphal East Manipur - 795 114 a graduate from a family of 11 members, was not involved in their household farming activities till he came across the income potential in mulberry kissan nursery during 2012. Then, he took up raising mulberry saplings of K2 and S-1635 varieties in his 1.25 acre land. He raises 70,000 saplings every year in one batch which are sold @ Rs.1.75 per sapling. He earns a net income of around Rs.65,000/- through kissan nursery, in a span of about 5-6 months.
4. Smt. Chavvakula Nookarathnam W/o. Shri Veera Babu, Village: Chebrolu District: East Godavari, Andhra Pradesh has been engaged in mulberry silk reeling on 10 basin 100 ends Multi-end Reeling machine since 2012-13. She has availed support for establishment of 10 basin Multi-end Reeling machine and reeling shed under CDP and State Plan schemes. She has undergone training in mulberry reeling activities under Beneficiary Empowerment Programme of CDP. She produces about 18 Kg. of superior quality 4A Grade raw silk every day. She has developed capacity to reel around 25 MT of cocoon per annum. Her annual raw silk production is about 5,110 Kgs. Her unit has made a total transaction of Rs.112.5 lakh and generated net profit of Rs.11.25 lakh from reeling activities.

POLICY INITIATIVES

1. Custom Duty on imports: At present a basic customs duty of 10% is levied on raw silk and silk fabric.

2. Anti Dumping Duty on Raw silk: In order to safeguard the interest of the domestic silk industry against the cheap imports, an antidumping duty of US\$ 1.85 per kg of the landed cost of imported raw silk of 3A grade & Below in the form of fixed duty has been imposed during December-2015 by Director General of Antidumping & Allied Duties (DGAD), which will be in force till Dec 2020.

B. STATUS OF SILK INDUSTRY

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 makers to recognize the industry among one of the most appropriate avenues for socio-economic development of a largely agrarian economy of India. Silk has been intermingled with the life and culture of the Indians. India has a rich and complex history in silk production and its silk trade which dates back to 15th century. Sericulture industry provides employment to approximately 8.60 million persons in rural and semi-urban areas in India. Of these, a sizeable number of workers belong to the economically weaker sections of society, including women. India's traditional and culture bound domestic market and an amazing diversity of silk garments that reflect geographic specificity have helped the country to achieve a leading position in silk industry. India has the unique distinction of being the only country producing all the five known commercial silks, namely, Mulberry, Tropical Tasar, Oak Tasar, Eri and Muga, of which Muga which is produced only in India with its golden yellow glitter is a prerogative of India.

India is the Second largest producer of silk in the World. Among the four varieties of silk produced in 2017-18, Mulberry accounts for 69.16% (22,066 MT), Tasar 9.37% (2,988 MT), Eri 20.87% (6,661 MT) and Muga 0.60% (192 MT) of the total raw silk production of 31,906 MT.

Performance of Sericulture Sector

Particulars	2015-16 Achmnt.	2016-17 Achmnt.	2017-18		2018-19	
			Target	Achmnt.	Target	Achmnt. (P) (Till Sept-18)
Mulberry Plantation (Lakh ha.)	2.09	2.17	2.42	2.24	2.46	2.40
RAW SILK PRODUCTION:						
Mulberry (Bivoltine)	4,613	5,266	6200	5874	7200	2872
Mulberry (Cross breed)	15,865	16,007	17275	16192	18100	8011
Sub Total (Mulberry)	20,478	21,273	23475	22066	25300	10883
V A N Y A						
Tasar	2,819	3,268	3450	2988	3650	193
Eri	5,060	5,637	6675	6661	6750	3058
Muga	166	170	240	192	260	123
Sub Total (Vanya)	8,045	9,075	10365	9840	10660	3374
GRAND TOTAL	28,523	30,348	33840	31906	35960	14257

Source: The data received from DOSs & compiled at CSB (Central office); P: provisional

Production during 2017-18

During 2017-18, the total raw silk production in the country was 31,906 MT, which is an increase of 5.1% over the production achieved during the last year and around 94.3% of the annual targeted production for the year 2017-18

The mulberry silk production was 3.7% more during 2017-18 over the previous year. The bivoltine raw silk production achieved a record production of 5,874 MT during 2017-18 by registering 11.5% growth over earlier year. Similarly,

vanya silk, which includes Tasar, Eri and Muga silks, has achieved 8.4% growth during 2017-18 over 2016-17.

The area under mulberry during 2017-18 was up by 3.3%

The State-wise production of Raw silk during 3 Years (2015-16 to 2017-18) and current financial year 2018-19 (till Sept-18) are given in **Annexure- I**.

Raw Silk Imports:

The quantity and value of raw silk imported during 3 Years (2015-16 to 2017-18) and current financial year 2018-19 (till Sept-18) are given below:

Year	Quantity (MT)	Value (Rs. in Crores)
2015-16	3529	1006.16
2016-17	3795	1092.26
2017-18	3712	1218.14
2018-19 (P) (April 18 to Sept-18)	1275	496.81

Source: DGCIS, Kolkata ; P : Provisional.

Exports:

The silk goods export earnings have decreased over the years due to global recession and reduction in demand for silk goods in western countries (Western Europe and the USA, which are the major consumers of silk goods). However, the silk exports are picking up to the non-traditional/new markets such as the UAE, Nigeria, Sudan, Thailand etc., which is an encouraging sign. The export earnings during 2017-18 were Rs. 1,649.48 crores. Export values of silk goods during 3 Years (2015-16 to 2017-18) and current financial year 2018-19 (till Sept-18) are given below:

Items	(Rs. in Crores)			
	2015-16	2016-17	2017-18	2018-19 (P) (Till Sept-18)
Natural Silk Yarn	30.31	15.33	15.67	4.74
Silk Fabrics	1280.60	1051.65	864.81	186.13
Readymade Garments	1078.39	864.33	650.48	555.64
Silk Carpet	16.88	63.78	17.34	18.25
Silk Waste	89.80	98.33	101.19	72.85
Total	2495.98	2093.42	1649.48	837.61

Source: Compiled from the Statistics of DGCIS, Kolkata; P: Provisional

Employment Generation:

The employment generation in the country is raised to 8.60 million persons in 2017-18 compared to 8.51 million persons in 2016-17, indicating a growth of 1.06%.

Annexure- I

State wise Raw Silk production during the last 3 Years (2015-16 to 2017-18) and current financial year 2018-19 till September-18

(in MT)

#	State	2015-16		2016-17		2017-18		2018-19 (Till Sept-18)	
		Target	Achmnt.	Target	Achmnt.	Target	Achmnt.	Target	Achmnt.
1	Karnataka	10000	9823	11000	9571	11120	9322	10750	5345
2	Andhra Pradesh	6700	5086	5505	5970	6090	6778	7805	3221
3	Telangana	135	116	150	119	160	163	200	52
4	Tamil Nadu	1700	1898	2000	1914	2000	1984	2190	890
5	Kerala	8	11	10	11	12	15	14	7
6	Maharashtra	248	274	285	259	328	373	415	164
7	Uttar Pradesh	265	256	280	269	300	292	340	80
8	Madhya Pradesh	207	257	275	111	230	103	160	---
9	Chhattisgarh	236	263	290	361	405	532	670	92
10	West Bengal	2601	2391	2706	2565	2590	2577	2775	857
11	Bihar	61	67	84	77	85	63	95	--
12	Jharkhand	2207	2284	2622	2631	2744	2220	2658	95
13	Odisha	118	117	130	125	140	116	148	--
14	Jammu & Kashmir	170	127	170	145	180	132	190	--
15	Himachal Pradesh	36	32	40	32	40	32	43	--
16	Uttarakhand	37	30	35	34	44	35	45	19
17	Haryana	1	0.6	1	1	2	0.7	2	0.53
18	Punjab	6	0.8	1	3	6	3	5	3
19	Assam & Bodoland	3330	3325	4103	3811	4705	4861	4980	1779
20	Ar.Pradesh	37	37	48	45	58	54	65	35
21	Manipur	428	519	530	529	560	388	435	247
22	Meghalaya	690	857	900	927	1070	1076	1110	840
23	Mizoram	65	64	70	76	100	83.6	105	58
24	Nagaland	652	631	690	678	770	615	633	439
25	Sikkim	13	6	10	9	17	0.001	3	--
26	Tripura	51	52	65	75	85	87	125	34
Total		30,000	28,523	32,000	30,348	33,840	31,906	35960	14257

(p): Provisional