



**CENTRAL SILK BOARD
BENGALURU – 560 068**

**MINUTES OF THE 67th MEETING OF THE RESEARCH COORDINATION COMMITTEE
OF CENTRAL SILK BOARD HELD ON 9th & 10th NOVEMBER 2022 AT CSB,
BENGALURU**

The 67th meeting of Research Coordination Committee of Central Silk Board was convened on 9th & 10th November 2022 at CSB-Bengaluru and Dr. B. T. Sreenivasa, Director [Tech.] & Member Convener of RCC, extended a warm welcome to Dr. S. Ayyappan, Chairperson of RCC, Members/ Invitees of the RCC, Joint Director [Admin] and other participants attending the meeting both physically and virtually through Webex platform (List of participants is appended as *Appendix*).

Dr. S. Ayyappan, Chairperson, RCC welcomed the RCC Members and other participants and in his opening remarks, thanked all the Chairpersons of RACs of CSB R&D institutes for accomplishing the RAC meetings before the RCC meet. He appreciated the team RCS for meticulously preparing the agenda and explanatory notes and circulating it well before the meeting. He requested all the Directors of CSB R&D institutes to work towards accomplishment of R&D activities under the on-going projects and suggested to focus on regional issues and farmers needs. He complimented CSB-Bengaluru and CTRTI-Ranchi besides the members of the organizing committees for successful conduct of the National Seminar on “Climate Smart Sericulture” and National Symposium on “Vanya Sericulture”. He also appreciated the Member Secretary & Secretary General, ISC and his team for bringing out a valuable compilation, "The Chronicles of Silk" which was released during the “26th International Congress on Sericulture and Silk Industry” at Romania.

He appreciated the improvement in quality of research publications with higher impact factor in peer reviewed journals and increase in number of publications. The Chairperson also appreciated the efforts of CSB R&D institutes and RCS/CO for coming out with reasonably good number of projects and requested for further efforts in seeking external funding and national/international collaborations. He expressed his serious concerns over repeated absence by some of the members in the important meetings like RCC and RAC.

Addressing to a query raised by the Chairperson RAC, Joint Director (Admn) informed the house on the refined recruitment procedure where in the candidates are being shortlisted based on Gate/ ICAR / IBPS etc score for various positions in CSB viz., Scientists, technical & administrative assistants, etc. Presently, the recruitment procedures for 5 Director Positions and 100 Scientists (for both pre as well as post cocoon sectors) are under progress. In this context, house opined that the scientists' positions to cover various disciplines related to sericulture sector precisely by considering merit & experience appropriately.

Later, Dr. S. Ayyappan, Chairperson of RCC initiated the meeting as per the agenda.

Item No.1: Confirmation of the minutes of the 66th meeting of RCC held on 5th & 6th April 2022 at CSB Bengaluru

As no comments have been received from any of the members, minutes of the 66th meeting of RCC held on 5th & 6th April 2022 at CSB, Bengaluru were confirmed.

Item No.2: Review of follow up action taken on the decisions of the 66th meeting of RCC held on 5th & 6th April 2022 at CSB Bengaluru

The follow-up action taken on the decisions/ recommendations of the previous meeting were presented by Dr. S. Manthira Moorthy, Scientist-D & In-charge RCS. While approving the action taken report, the committee made the following suggestions.

- To finalize / shortlist major challenges, opportunities & its strategies in consultation with the concerned RAC Chairperson, to include an agenda point on interaction of the same in the next RCC meeting.
- The next RCC meeting may be planned preferably at Guwahati for which needful preparatory works to be initiated well in advance.
- After detailed discussions on absence of RAC Chairman of CMERTI-Lahdoigarh who was unable to spare time to hold the RAC meetings, may be due to his busy schedule, committee suggested to change / replace the Chairperson to Dr. B. C. Deka, VC, AAU-Jorhat. Further, committee also decided not to invite the Members of RCC / Chairpersons of RAC who were unable to spare time for the RCC / RAC meeting for two consecutive sittings/meets.
- For holistic development of the host plants and to ensure higher productivity, Integrated Farming System (IFS) to be developed in the concerned zone/ sector. Further, a study on scope of organic/natural farming may be explored.
- Directors / In-charge Officers heading various R&D institutions and seed organizations of CSB are expected to lead the concerned institute / organization, utilize the available resources effectively, motivate / assign new challenges to the scientific staff working under and should come up with new ideas. They should create good environment for research and should be available to the scientists for discussions / guidance.
- To encourage and attract the young entrepreneurs, startups in the field of sericulture similar to agriculture / horticulture. CSB R&D institutes should also explore the possibility of development of good / viable agro-forestry model besides working on climate change and land degradation challenges in sericulture.
- The research works in the field of Vanya Sector invariably to be taken up in association / collaboration with CTRTI-Ranchi for Tasar, CMERTI-Lahdoigarh for Muga, Eri & Oak tasar and concerned seed organizations.

Action: All CSB R&D institutes & Seed Organizations

- To gain first hand information / experience on the field problems and to understand the extension mechanism, the new batch of scientists to be recruited shortly need to be given an opportunity to work in the extension units viz. RECs, BSFs and seed production units across all the sectors.

- Similarly, CSB may also look into the other manpower requirements (both technical and non-technical) for effective execution/implementation of the mandated activities. Besides mapping of scientists performance may be taken into account for promotion and transfer.

Action: Establishment Section, CO, CSB-Bengaluru

- To ascertain the status of global silk demand (international silk trade) besides, studying the new market avenues and the quality of silk in demand.
- To develop economic models for different silk sectors.

Action: Statistic Section, CO, CSB-Bengaluru

- To list-out the institute-wise technologies developed, patents applied/ granted, commercialized and revenue generated and to upload the particulars of the viable technology details on to the CSB website.

Action: IP&BP Cell, CO, CSB-Bengaluru

- As CSB is aiming to become a global leader in silk production, working on creation of trade mark for “Indian Silk” should be the immediate priority to capture the global silk market. Accordingly, an action plan may be prepared and presented in the next RCC meeting.

Action: PCT Section, CO & SMOI, CSB-Bengaluru

- If the set raw silk production targets are to be reached, expansion / exploration / introduction of sericulture in the non-traditional areas are must, for which CSB in association with concerned DoSs should prepare an action plan to introduce / expand sericulture in the un-explored areas. If necessary, the intervention / involvement of local agriculture universities could be explored.
- Periodical meetings to be organized with state sericulture departments, line departments, KSSRDI, APSSRDI and other state universities to discuss various issues
- To plan for further strategies for industry development in association with Central Office CSB Bengaluru.

Action: CSRTI-Mysuru & other R&D Institutes

- To strengthen extension mechanism in East and North Eastern Region for promotion of mulberry sericulture and make appropriate strategies to improve the silk production.

Action: CSRTI-Berhampore

- To study / ascertain the reasons for reduced / low productivity of Vanya silks and an action plan may be prepared for stabilisation/ increasing the productivity.
- The proposed studies on vegetative propagation of *Q. serrata* may be revisited, for production and utilization of oak tree plantation in the northeastern states for oak tasar production.

Action: CTRTI-Ranchi & CMERTI-Lahdoigarh

- To reframe the mandate of units / institutes in consultation with the concerned RAC Chairperson and the final draft of the mandate to be circulated to the RCC members well before conduct of the next RCC meeting, for discussion and finalization in the next RCC meeting.

Action: All CSB R&D institutes & Seed Organizations

- To develop/ workout proper extension mechanism to evaluate and disseminate the developed technologies in the field.

Action: All CSB R&D institutes & Seed Organizations

- As the excessive use of chemical dyes proven hazardous, possibilities of usage of natural / plant based dye substances may be explored besides, working on reduction of cost of silk garments. The other issues viz. water, fuel/energy, health hazards etc., may also be looked into.

Action: CSTRI-Bengaluru

- For effective monitoring of the diseases, especially pebrine, the monitoring mechanism to be strengthened and the team comprising pathologists and the DoS Officers should collectively take up the sample testing activities periodically.

Action: CSRTI, Mysore, SSTL-Kodathi & DOSs of South India

- To prepare a road map for quality silkworm seed production vis-a-vis raw silk production for next 5 years.

Action: NSSO, Bengaluru

- To extend all possible support in implementation of Centrally Sponsored Schemes (Silk Samagra-2), besides evaluation and utilization of technologies developed by the CSB in the field.

Action: DoS - Karnataka/Tamil Nadu/Andra Pradesh/Telangana/ J & K / WB

- DoS Assam to support P2 seed production of Muga and Eri.

Action: DoS-Assam & MESSO-Guwahati

Item No.3:Review of Progress of CSB R & D Institutes: Projects Initiated & Concept notes and Concluded (April 2022 – October 2022)

Highlights of the major R&D achievements, publications etc. made during the period were presented by Dr. B. T. Sreenivasa, Director [Tech.]. The objectives, methodologies & expected output/outcome of newly initiated projects/project proposals & utility of concluded projects were presented by concerned CSB R&D institutes. After detailed deliberations, the following suggestions/recommendations were made.

- RACs to rigorously monitor the progress of on-going projects and facilitate meaningful deliberations on the outcome of concluded projects.
- Periodical meetings with scientists including extension scientists and stakeholders are necessary and also arrange for frequent meetings with the subject experts at institute level.
- The quality of the power point presentations is observed to be consistently poor which needs to be thoroughly checked before presenting in the RCC meeting. The PowerPoint presentations should be focused and crisp.

Action: All CSB R&D Institutes

INSTITUTE SPECIFIC RECOMMENDATIONS (Details of projects presented at *Annexure I & II*)

1. CSR&TI-Mysuru:

- a. CSB coded projects were ratified with comments as initiate projects as per methodology proposed in the project.
 - **BPS 01027 CN** (Adjuvant effects of Chitosan Nano-particles)
 - **BPS 01028 CN** (Value Addition of Cellulose and Chitin Isolated)
 - **ARE 01029 MI** (Novel fungicidal and insecticidal applications)
 - **MOE 01031 CN** (Technology Demonstration and Evaluation in Navsari)
- b. The concluded projects were reviewed and the following were suggested
 - **AIB 01004 MI** (Multivoltine breeds development), utilize improved MV lines for further breeding programmes of ICB

2. CSRTI-Berhampore:

- a. CSB coded projects were ratified with comments as initiate projects as per methodology proposed in the project.
 - **AIE 02018 SI** (Superior bivoltine foundation cross as a male component)
 - **AIB 02019 MI** (Development of double hybrids)
- b. The concluded projects were reviewed and the following were suggested
 - **AIB 02009 MI** (Authorization Trial 12Y x BFC1), co-ordinate with NSSO & DOSs closely for reaching authorized hybrids at field level effectively
 - **AIC 02004 CN** (Low molecular weight peptide isolation against flacherie disease), work-out techno-economic feasibility of designed four antimicrobial peptides for commercial exploitation

3. CSRTI-Pampore:

- a. The findings of the concluded project was approved with the following observations
 - **PIB 3629** (development of drought tolerant mulberry genotype), identified mulberry progenies to be evaluated further

4. CTRTI-Ranchi:

- a. Five new concept proposals were considered with the following observations
 - **CSB/CTR/RCN 178**: ITKs to be properly enlisted, documented and evaluated for its utilization in tasar sericulture sector
 - **CSB/CTR/ RCN 193**: Use effect of abiotic factors on tasar food plants & silkworms. Measure the parameters
 - **CSB/CTR/ RCN 194**: Collection of disease incidence along with weather parameter for proper establishment of forewarning and forecasting calendar / system
 - **CSB/CTR/RCS 195**: apart from temperature, humidity may be taken into account for recording and evaluating the thermo-tolerant topical tasar line
 - **CSB/CTR/RCS 196**: Conservation of eco-races is need for the hour. Proposed three locations/ eco-races at Odisha (Model), Jharkhand (Sarihan) and Chhattisgarh (Raily) to be studies properly, besides SoP for conservation to be discussed thoroughly with experts

5. CMERTI-Lahdoigarh:

- a. One concluded research project was reviewed and the following suggestions were made
 - **BPP 05014 CN** (Mulberry Beverage), customer feedback to be completed for all the three processes. Process patents may be applied / taken-up in co-ordination with collaborating institutes

6. CSGRC-Hosur: -

7. CSTRI-Bengaluru:

- a. Three research projects were ratified with the following observations
 - **CFW 07029 CN, CED 07030 SI & CYR 07031 SI:** To be carried out as per the proposed work plan/ objectives. After working out on the designing and fabrication of the warp strapping machine, validate the same in field for its efficacy and take up the patenting and commercialization of the same
- b. Two concluded projects were reviewed and the following observations were made
 - **CFC 07020 SI (Influence of raw silk denier on fabric properties):** The outcome of the project should reach the stakeholders and CSTRI should prepare & submit an action plan to popularize the same among the stakeholders
 - **CYF 07016 SI (Protocol for computerized Zari testing):** The non destructive testing method of zari is appreciated and the protocols of computerized zari testing should be submitted to BIS on priority

8. SBRL-Kodathi:

- a. Concluded projects were reviewed and the following observations were made
 - **PRP 08002 MI (Powdery Mildew Resistant Genes),** to focus on utilization of identified marker for resistant line development/ breed development, besides publishing the research findings in reputed journal

9. SSTL-Kodathi: -

10. CO-Bengaluru:

- a. One coded research project was ratified and another new concept proposal was approved by the RCC with the following observations
 - **MIS 13002 MI:** Major social indicators to be focused while collecting data in impact study
 - **CSB/CO/RCN 192:** In place of drought, word 'moistures stress' may be incorporated/ replaced in the revised proposal

Item No.4: Review of Progress of CSB Silkworm Seed Organizations

The progress and issues pertaining to seed organizations/industry were discussed.

1. NSSO-Bengaluru:

- To make efforts to introduce newly authorized silkworm hybrids in co-ordination with concerned CSB R&D institutes and DoSs
- Channeling / multiplication of the authorization trial breeds / pipeline breeds to be taken up in co-ordination with progenitor institute
- Traditional sericulture practicing states should be self-sufficient in quality silkworm seed production
- To strengthen ASRs for quality seed cocoon production
- To intensify the activities w.r.t. quality silkworm seed production

2. BTSSO-Bilaspur:

- To work vibrantly in association with concerned DOSs & CSB institutes
- Basic challenges in the tasar seed production and supply need to be worked-out and rectified

3. MESSO-Guwahati:

- To be pro-active in execution mandated activities in close association with concerned DoSs and CMERTI-Lahdoigarh
- Explore the possibility of private stakeholders' participation in vanya seed sector

Item No. 5: Review of National Seminar on “Climate Smart Sericulture”

The committee reviewed the recommendations of the National Seminar on Climate Smart Sericulture -2022 organized by CSB on 6th & 7th Oct., 2022 at Bengaluru and suggested following.

- To circulate the final recommendations among the CSB R&D institutes, Universities, DoSs and stakeholders to take up research projects/ technology development/ policy drawing etc.

Item No. 6: Review of National Symposium on “Vanya Sericulture”

The committee reviewed the recommendations of the National Symposium on Vanya Sericulture organized by CTR&TI-Ranchi on 28th & 29th Oct., 2022 at Ranchi and suggested following.

- To finalize the recommendations and circulate among the vanya CSB R&D institutes, Seed organizations, DoSs and stakeholders.
- The final recommendations to be taken up in the form of project, technology, policy decision in vanya sector etc and to evaluate.

The RCC also emphasized on sticking to the project time lines, avoid repeated extensions of project period, besides poor utilization of the allocated budget. The Directors were advised to co-ordinate with the DoSs and frequent farmers interaction to analyze the field problems and to address the same with appropriate solutions.

After the closing remarks by the Chairperson and the Members of RCC, the meeting ended with vote of thanks offered to the chair and all other members & invitees by Sh. Nazeer Ahmed Saheb, Scientist – D, RCS.

Date: 28.11.2022

Place: Bengaluru



[S. Ayyappan]
Chairperson
Research Co-ordination Committee
Central Silk Board, Bengaluru

**CENTRAL SILK BOARD
BENGALURU - 560 068**

**LIST OF PARTICIPANTS IN THE 67th MEETING OF RCC HELD ON 9th & 10th NOVEMBER 2022
AT CENTRAL SILK BOARD, BENGALURU**

1. Dr. S. Ayyappan, Chairperson, RCC
2. Dr. S. B. Dandin, Member RCC
3. Dr. R. S. Deshpande, Member RCC
4. Dr. Ashok K. Patra, Member RCC
5. Shri Manzoor Ahmad Qadiri, KAS, Director, SDD, J&K (UT), Member RCC
6. Smt Vijayalakshmi H. R. Joint Director, DoS, Karnataka, Member RCC
7. Dr. B.T. Sreenivasa, Director [Tech.] & Member Convener CSB, Bengaluru

Permanent Invitees

8. Prof. M. B. Chetti, RAC Chairman CSR&TI-Mysuru
9. Prof. Chirantan Chattopadhyay, RAC Chairman CSR&TI-Berhampore
10. Prof. Nazeer Ahmed, RAC Chairman CSR&TI-Pampore (Attended online)
11. Prof. Onkar Nath Singh, RAC Chairman CTR&TI-Ranchi
12. Dr. Chandish R. Ballal, RAC Chairman CSGRC-Hosur
13. Prof. Mangesh D. Teli, RAC Chairman CSTRI-Bengaluru (Attended online)
14. Dr. N. K. Krishna Kumar, RAC Chairman SBRL-Kodathi
15. Prof. G. Subramanya, RAC Chairman SSTL-Kodathi
16. Dr. A.V. Marry Shery (Joseph), Scientist - D & In-charge, CSR&TI-Mysuru
17. Dr. C. M. Kishor Kumar, Director, CSR&TI-Berhampore
18. Dr. Sardar Singh, Scientist - D & In-charge, CSR&TI-Pampore (Attended online)
19. Dr. K. Sathyanarayana, Director, CTR&TI-Ranchi
20. Dr. K. M. Vijayakumari, Director, CMER&TI-Lahdoigarh
21. Dr. Y. C. Radhalakshmi, Scientist - D & In-charge, CSTRI-Bengaluru
22. Dr. K. M. Ponnuvel, Scientist - D & In-charge, SBRL-Kodathi
23. Dr. Chandrashekar R. Hegde, Scientist - D & In-charge, SSTL-Kodathi
24. Dr. K. K. Sharmila, Scientist - D & In-charge, NSSO-Bengaluru
25. Dr. A. Venugopal, Director, BTSSO-Bilaspur
26. Dr. Prabhat Borpuzari, Scientist - D & In-charge, MESSO-Guwahati

Board Secretariat

27. Dr. S. Manthira Moorthy, Scientist - D & In-charge RCS, CO-Bengaluru
28. Dr. Jula Nair, Scientist - D & Editor Sericologia/IJS, CO-Bengaluru
29. Dr. V. K. Rahmatulla, Scientist - D & In-charge Seed Section, CO-Bengaluru
30. Shri Joy N John, Scientist - D & In-charge CBT, CO-Bengaluru
31. Dr. P. Kumaresan, Scientist - D & In-charge Statistics Section, CO-Bengaluru
32. Shri Nazeer Ahmed Saheb, Scientist - D, RCS, CO-Bengaluru
33. Dr. Prashanth Sangannavar, Scientist - C, RCS, CO-Bengaluru
34. Dr. Manjunatha G R, Scientist - C, RCS, CO-Bengaluru

Invitees

35. Shri Julian Tobias, Joint Director (Admin), CSB-Bengaluru
36. Dr. S. Bala Saraswathi, Scientist - D, CSR&TI-Mysuru
37. Dr. Aftab Ahmad Shabnam, Scientist - D, CMER&TI-Lahdoigarh
38. Dr. M. Maheswari, Scientist - D, CSGRC-Hosur
39. Sh. V. K. Harlapur, Scientist - D, NSSO-Bengaluru
40. Dr. N. B. Chowdhury, Scientist - D, BTSSO-Bilaspur
41. Dr. Halagundegowda G R, Scientist - C, CO-Bengaluru
42. Dr. A. Ramesha, Scientist - C, SBRL-Kodathi
43. Dr. G. Subrahmanyam, Scientist - C, SBRL-Kodathi
44. Sh. Kiran Batheri, Assistant Director (Publicity), CO-Bengaluru

Absentees

1. Dr. H. S. Ginwal, Member RCC
2. Dr. R. K. Sharma, Member RCC
3. Dr. P. G. Patil, Member RCC
4. Dr. Rajeev K. Varshney, Member RCC
5. Prof. P. J. Handique, RAC Chairman CMER&TI-Lahdoigarh
6. The Commissioner of Sericulture, DoS, Govt. of West Bengal, Member RCC
7. The Additional Commissioner of Sericulture, DoS, Govt. of Assam, Member RCC

**RESEARCH PROJECTS INITIATED & NEW PROJECT PROPOSED BY CSB R&D INSTITUTES
(APR 2022 – OCT 2022)**

#	Project Code, Title & Period	Expected outcome
I	CSR&TI-Mysuru	
1.	BPS 010027 CN: Immunomodulatory and Adjuvant effects of Chitosan Nanoparticles Extracted from <i>Bombyx mori</i> [May., 2022 to Apr., 2024]	<ul style="list-style-type: none"> ➤ The nanoparticle based immunoboosters will be developed for the improvement of silkworm as well as human health conditions. The nano-based bio-formulations can be used as spray for improvement of health conditions (it can act as curative as well prophylactic measures for management of silkworm diseases). ➤ Hence, the investigators hypothesize that recombinant spike protein of SARS-CoV-2 delivery of chitosan-based nano-vaccine would enhance both mucosal antibody and cellular immune responses and provide better protective immunity
2.	BPS 010028 CN: Value Addition of Cellulose and Chitin Isolated from Sericulture Waste for Advanced Packaging Applications [May., 2022 to Apr., 2024]	<ul style="list-style-type: none"> ➤ The project aims to develop new food packaging system using cellulose and chitin from sericulture waste. The biopolymer nanocomposites, derived from sericulture (specifically cellulose and chitin), will represent the support on which further functionalization, based on coating or lamination treatments, will be developed for obtaining an environmentally sustainable packaging able to guarantee the optimal preservation of foods. This solution is expected to be potential alternative to current fossil-based packaging solutions. ➤ Project will also evaluate the environmental impact (LCA), social impact and verifying its end-of-life phase significantly more sustainable than current plastic solutions and its price affordable
3.	ARE 01029 MI: Recommendation of novel fungicidal and insecticidal applications for mulberry [May., 2022 to Apr., 2024]	<ul style="list-style-type: none"> ➤ The outcome of the research under the project is expected to generate information on identifying suitable fungicides/nematicides/ insecticides as an alternate to the already recommended chemicals for replacement and strengthening the existing IPM package against Mulberry pests and diseases. ➤ Safe and eco-friendly novel fungicides/nematicide/ insecticides molecules for management of mulberry pest and diseases
4.	MOE01031CN : Technology Demonstration and Evaluation of Rearing Performance of Bivoltine Mulberry Sericulture In Navsari District (Gujarat) [Aug., 2022 to Jul., 2024]	<ul style="list-style-type: none"> ➤ Establishment of suitable sericulture model at Navsari (Gujarat) for further horizontal expansion
II	CSR&TI-Berhampore	
5.	AIE 02018 SI: Identification of superior Bivoltine foundation cross as a male component to improve cross breed productivity in E & NE India. [May 2022 to Oct. 2024]	<ul style="list-style-type: none"> ➤ New productive bivoltine foundation crosses will be developed with higher productivity traits (Shell weight: 0.27 to 0.32g; Shell: 18 to 20%) ➤ Newly developed productive bivoltine foundation crosses when combined with sturdy ruling multivoltines, expected to increase silk productivity particularly in Eastern region and in general at North-eastern region
6.	AIB 02019 MI: Development of bivoltine double hybrids suitable for different regions of India. [Jun., 2022 to May., 2025]	<ul style="list-style-type: none"> ➤ Parental breeds /FCs with crop stability ➤ Productive bivoltine hybrids with high temperature and high humidity tolerance is expected to increase silk productivity
III.	CSR&TI-Pampore	
	Nil	
IV.	CTR&TI-Ranchi	
7.	Documentation and validation of indigenous technical knowledge (ITKS) in tropical tasar zone	<ul style="list-style-type: none"> ➤ Integration of ITKS with improved technologies in association with Tropical Tasar culture activities leads to evolution of new sustainable ITK based tasar technologies in different component

#	Project Code, Title & Period	Expected outcome
	[CSB/CTR/RCN 178] (03 years)	of tasar culture i.e., Host plant improvement, Seed production, Silkworm rearing and post cocoon technologies
8.	Impact of climate change on tasar food plants and silkworm [CSB/CTR/RCN 193] (03 years)	<ul style="list-style-type: none"> ➤ Region wise data base about climatic parameters and its effect on tasar food plants and silkworm ➤ Region wise data base about natural disaster and its effect on tasar food plants and silkworm
9.	Tasar silkworm disease monitoring and management [CSB/CTR/RCN 194] (05 years)	<ul style="list-style-type: none"> ➤ Status of pebrine incidence and other diseases in the field will be ascertained. ➤ Suffice the Database of tasar silkworm diseases and development of interactive portal about tasar silkworm diseases. ➤ This study forms the basis for the Tasar silkworm seed replenishment and decision making in tasar silkworm disease monitoring and management systematically and effectively
10.	Recurrent Selection and Multiplication of Thermo Tolerant Line(s) of Tropical Tasar Silkworm [CSB/CTR/RCN 195] (03 Years)	<ul style="list-style-type: none"> ➤ Thermo-tolerant line of Daba BV through developed SCAR marker assisted selection and to understand the impact of temperature in the gender specific tolerance level. Effect of temperature over the sperm quality would be explored
11.	<i>In situ</i> Conservation of Modal Ecorace of Tasar silkworm in Odisha [CSB/CTR/RCN 196] (03 Years)	<ul style="list-style-type: none"> ➤ The conservation strategy for the Modal ecorace will lead to the multiplication and utilization of wild silk moths thereby benefitting the local tribal inhabitants by creating avenues of earning through tropical and oak tasar culture. ➤ The project also envisages the training and awareness creation among the local inhabitants in or nearby the forest so that they would continue the process of conservation through sustainable utilization approach. ➤ The allelic structure in connection with phenotypical variation would be explored
V.	CMER&TI-Lahdoigarh	
	Nil	
VI.	CSGRC-Hosur	
	Nil	
VII.	CSTRI-Bengaluru	
12.	CFW0 07029 CN - Development of Standard norms for the generation of silk and zari waste during preparatory and silk weaving process in Kanchipuram cluster [Aug., 2022 to Jul., 2023]	<ul style="list-style-type: none"> ➤ The revised norms will help the co- operative societies to monitor and maintain the quality of their raw material and final product. ➤ It helps to maintain the uniform norms for waste generation for particular variety. ➤ Cost of the products may be reduced similarly quality will be improved
13.	CED 07030 SI : Design and development of silk warp strapping machine [Oct., 2022 to Mar., 2024]	<ul style="list-style-type: none"> ➤ Mechanized rubber strap machine available for warp binding to silk dyeing stake holders. ➤ Eliminates complete drudgery in silk warp dyeing preparatory process. ➤ Increases the production of silk warp dyeing. ➤ Reduction in dyeing time and labour cost
14.	CYR 07031 SI : Study on fictional force between devious detection and yarn [Oct., 2022 to Sept., 2024]	<ul style="list-style-type: none"> ➤ The optimized chain length settings technology package will be evolved. This technology will be utilized for improving the raw silk quality by ARM reelers
VIII.	SBRL-Kodathi	
	Nil	➤
IX.	SSTL-Kodathi	
	Nil	
X.	CO-CSB Bengaluru	
15.	MIS 13002 MI : Impact Assessment of mulberry sericulture Technologies in India [Jul., 2022 to Jun., 2025]	<ul style="list-style-type: none"> ➤ Determination of socio-economic impact of technologies adopted by the sericulture practitioners ➤ Estimate the economic improvement by the technology adoption ➤ Estimate the profitability of sericulture sectors in comparison to

#	Project Code, Title & Period	Expected outcome
		agri/horti-culture ➤ Enables to identify need based technologies and refine technologies, if necessary
16.	Evaluation for sericulture strategic preferences towards drought management and adoption of drought coping mechanisms : A constructive component for sericulture income security in dry agro climatic zones of Karnataka [CSB/CO/RCN 192] (02 Years)	➤ The farmer's wise adoption index was calculated for 30 identified drought management technologies. The soil moisture conservation technologies like green manuring have very low percent of adoption. But the adoption index for trenching and mulching is 43 percent which is encouraging. The technologies such as summer ploughing and rain water harvesting in mulberry garden also have very low level of adoption. The important technologies in rearing shed required for temperature humidity maintenance have very low adoption. Technologies such as Harvesting of mulberry leaves, transportation of harvested leaves and preservation of shoots have good % of adoption

**RESEARCH PROJECTS CONCLUDED BY CSB R&D INSTITUTES
(APR 2022 – OCT 2022)**

#	Project Code, Title & Period	Major findings
I.	CSR&TI-Mysuru	
1.	AIB 01004 MI: Development of multivoltine breeds with improved silk quality utilizing indigenous and exotic bivoltine breeds [Sep., 2018 to Aug., 2022]	<ul style="list-style-type: none"> ➤ The improved lines were developed using the Bulgarian breed BM2 and the indigenous breed S8. ➤ Through Marker assisted selection the lines were screened for diapause and non diapause genes. ➤ The lines with non diapause characters have been taken forward and stabilized. ➤ The crossbreeds prepared from these lines stabilized lines did not exhibit hibernation character. ➤ The crossbreeds exhibited 2A to 3A grade silk
II.	CSR&TI-Berhampore	
2.	AIB 02009MI: Authorization trials of silkworm hybrid, 12Y x BFC1 in E & NE India. [Aug., 2020 to Jul., 2022]	<ul style="list-style-type: none"> ➤ HAC committee recommended the improved crossbreed 12Y x BFC1 for authorization and commercial exploitation in E and NE India
3.	AIC 02004CN: Molecular characterization and assessment of the efficacy of low molecular weight peptide isolated from mulberry leaf against flacherie disease of silkworm [May., 2019 to Aug., 2022]	<ul style="list-style-type: none"> ➤ Identified antimicrobial peptides non-specific Lipid transfer protein 1, Pathogenesis related protein 1, Osmotin, Germin-like protein, 18kDa winter accumulating protein, Galactose-binding lectin through Mass spectrometry analysis of mulberry leaf protein ➤ Antibacterial activity of crude, semi-purified and purified mulberry leaf peptides against bacterial pathogens (Bacillus safensis, Bacillus thuringiensis, Bacillus flexus, Bacillus megatarium, Micrococcus luteus, Micrococcus terreus, Serratia nematodiphila, Staphylococcus aureus, Staphylococcus vitulinus, Staphylococcus sciuri and Enterobacter hormaechi) causing flacherie disease in silkworms, was confirmed in vitro. ➤ Antimicrobial activity of the purified extract was demonstrated in larvae after the bacterial infection through bioassay. Survival rate (80%) was equivalent to control (~85%) in larvae fed with purified mulberry leaf extract ➤ Designed four antimicrobial peptides based on Mass spectrometry results of mulberry leaf peptide and in silico analysis to validate the antimicrobial activity
II.	CSR&TI-Pampore	
4.	PIB-3629: Development of drought tolerant mulberry genotype suitable for rainfed hill farming in North-West India [Jan., 2018 to Jun., 2022]	<ul style="list-style-type: none"> ➤ Evaluation of preliminary shortlisted genotypes grown inside rainout shelter for physio-biochemical parameters is under progress for final round of selection
IV.	CTR&TI-Ranchi	
	Nil	
V.	CMER&TI-Lahdoigarh	
5.	BPP 05014CN: Standardization of Processing and Production of a Consumable Beverage from Mulberry Leaves and Blending with Green Tea [Mar., 2020 – Jun., 2021 Extended upto June 2022]	<ul style="list-style-type: none"> ➤ Developed three different processing method / products for mulberry beverage. ➤ 3000 samples of each process are under field evaluation stage/ customer feedback. ➤ Patent will be filled for all three processes.
VI.	CSGRC-Hosur	
	Nil	
VII.	CSTRI-Bengaluru	
6.	CFW 07020SI - Studies on influence of raw silk denier on	<ul style="list-style-type: none"> ➤ Detail studies have been made on the influence of using coarse denier yarns in the limited range (26/28 , and its ply, 40/44d and its ply) in

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	fabric properties and its Economics [Mar., 2021 to Aug., 2022]	<p>place of finer/existing denier (20/22d and its ply) yarns specially in weft on the fabric properties in respect of Soft silk, Taffetta and Crepe fabrics. Coarse denier yarns are used where not much twist insertion is essential. In Soft silk and Taffetta fabrics in warp 2ply yarn is employed where as in weft 2ply, 3ply and 4 ply are used. In producing crepe fabrics single ply yarns are used in warp and 2ply,3 ply and 4 ply weft yarns are used</p> <ul style="list-style-type: none"> ➤ It is observed from the results that most of the important mechanical and comfort properties and low stress mechanical properties of the fabrics in the case of selected coarse deniers (in warp/weft) are almost on par (except few cases)with those in the case of fabric with existing fine denier silk selected for the study. It is to be noted that Production of coarse deniers in silk reeling as compared to finer denier and use of coarse deniers in weaving preparatory and weaving processes in place of plied yarns of finer denier result in significant reduction of production cost due to increase in productivity. The economy of silk reelers and weavers will improve appreciably besides reduction in labour. ➤ The industry is producing set of fabrics using existing fine/medium deniers. These fabrics are well accepted by the industry. The outcome of the present research has given alternate concept (using comparatively coarse denier in the limited range)without affecting the quality of fabric particularly when the industry facing unfavourable conditions / market fluctuation to achieve better economics /profits. Further Soft silk, Taffetta and Crepe fabrics with new construction particulars have been also developed along with existing ones
7.	CYF 07016SI : Development and validation of protocol for computerized zari testing [Oct., 2022 to Sep., 2022]	<ul style="list-style-type: none"> ➤ 90 fine zari samples have been prepared as Standards to calibrate the XRF-ED equipment. ➤ The Zari testing protocol has been established and the results are at par with Gravimetric analysis. ➤ The estimation of the silk content through AI technique through python programming has been achieved. ➤ Grading of fine zari has been finalized based on Gold, Silver and Silk content which is Alphanumeric value
VIII	SBRL-Kodathi	
8.	PRP08002MI: Identification of powdery mildew resistant genes and validation of CAPS marker for Chalcone synthase in mulberry Spp. Caused by <i>Phyllactiniacorylea</i> (Pers.) Karst. [May., 2019 to May., 2022]	<ul style="list-style-type: none"> ➤ Identified 16 <i>Mildew Resistance Locus O (MLO)</i> genes from mulberry through orthology and MLO domain searches. Through bioinformatics and wet lab experiments identified <i>MLO2</i> and <i>MLO6A</i> as candidate genes involved in powdery mildew susceptibility in mulberry ➤ Detected alternative splicing of <i>MLO</i> genes resulting in truncated proteins in tolerant germplasms of ME-0260, ME-0267, ME-0125 and MI-0028. ➤ Association of CAPS marker of chalcone synthase with powdery mildew tolerance was analyzed in segregating population of Kajli-OP X V1 and S1 X Vietnam 2 and in different germplasms found that marker and powdery mildew tolerance association is statistically not significantly
IX.	SSTL-Kodathi	
	Nil	