CENTRAL TASAR RESEARCH AND TRAINING INSTITUTE, RANCHI

1. Organizational Set up

Unit	No	Place
RSRSs	6	**Tropical:**
		1. Dumka (Jharkhand) 2. Baripada (Odisha) 3. Bhandara (Maharashtra) 4. Jagdalpur (Chhattisgarh) **5.** Warangal (Andhra Pradesh)
		Temperate:
		1. Bhimtal (Uttarakhand)
P4 Station	1	**Tropical:**
		1. P4 Station, Chakradharpur (Jharkhand)
RECs	3	**Tropical:**
		1. Kapistha (West Bengal) 2. Siwani-Champa (Chhattisgarh)
		Temperate:
		1. Palampur (Himachal Pradesh)
Raw Material Bank	1	1. RMB, Chaibasa (Jharkhand)

2. R&D Projects, TOT, ECP, CBT etc:

	Item	Target	Remarks
1.	**CSB coded Research projects**		
1.1	**With PI from the Institute**		
1.1.1.	Projects of earlier year continued through the year 2022-23	07	**Annex 4.I.1**
1.1.2.	Projects to be concluded during the year 2022-23	06	**Annex 4.I.2**
1.1.3.	New Projects to be initiated during 2022-23	08	**Annex 4.I.3**
1.2.	**With CI from the Institute (Collaborative)**		
1.2.1.	Projects of earlier year continued through the year 2022-23	01	**Annex 4.I.4**
1.2.2.	Projects to be concluded during the year 2022-23	02	**Annex 4.I.5**
1.2.3.	New Projects to be initiated during 2022-23	0	**Annex 4.I.6**
2.	**Transfer of Technology**		
2.1	**On Station Trials (OST)**		**Annex 4.II.1**
2.1.1	No. of technologies to be validated	07	
2.1.2	No. of trials to be conducted	63	
2.2	**On Farm Trials (OFT)**		**Annex 4.II.2**
2.2.1	No. of technologies to be demonstrated	02	
2.2.2	No. of locations to be covered	11	
2.2.3	No. of stakeholders to be covered	96	
3.	**Capacity Building & Training (CBT)**		**Annex 4.III**
3.1	No. of programmes to be conducted	64	
3.2	No. of stakeholders to be trained	1401	
3.3	No. of programmes to be conducted (KVK)	1	
3.4	No. of stakeholders to be trained (KVK)	24	
4.	**Extension Communication Programs (No.)**		**Annex 4.IV**
4.1	Krishi Mela / Reelers Mela cum exhibition	07	
4.2	Farmers Field day	36	

4.3	Awareness programme	28	
4.4	Technology demonstration / Enlightenment programmes	40	
4.5	Workshop / Seminars & Conferences	06	
4.6	Other activities (*Please specify*).	-	
5.	**Soil Samples to be analyzed**	200	**Annex 4.V**
6.	**Information, Education & Communication**		**Annex 4.VI**
6.1	Periodicals	3	
6.2	Publications	37	
6.3	Extension literature	4	
6.4	Films / Videos	3	
6.5	Social media	200	
7.	**Patents to be filed/ granted, technologies to be commercialized, Software, mobile/ android app developed etc.**	3/0/1/0	**Annex 4.VII**
8.	**Revenue generation (Rs. in Lakhs)**	25.00	**Annex 4.VIII**
9.	**Procurement of equipments and other accessories (Rs: in lakh)**	198.15	**Annex 4.IX**
10.	**Other activities *(pl specify)*** i) Conservation and popularization of local eco-races in situ conditions. ii) Swach Bharat programmes iii) Production of vermi compost by each unit iv) P-4 rearing, grainage and other activities. v) Oak tasar preponed rearing, cocoons purchase and other activities. vi) Popularization of viable Technologies vii) Maintenance of Farm/ Plantation & TTP (Institute) viii) Maintenance of Farm/ Plantation (Nested units) ix) Adoption of farmers x) Demonstration of viable technologies at KVKs xi) RMB Activities	11	**Annex 4.X**
11.	**Targets proposed at a glance for the year 2022-23**		**Annex 4.XI**

1. CSB coded Research projects

1.1. With PI from the Institute

Annex- 4.I.1

1.1.1 Projects of earlier year continued through the year 2022-23

#	Code	Title	Start	End	Milestone to be crossed	Progress to be achieved	Financial (Rs. In lakhs)
At main institute							
1.	BPC-04008 EF	Mass level extraction of sericin from tasar cocoon cooking waste water for its prospective utilization	Mar, 2021	Feb, 2024	Physical and chemical nature of Daba and Modal sericin. (Separated from cocoon cooking water). Study of biological properties of Daba and Modal sericin. Data analysis and yearly report	Standardisation of separating protocol for isolation of sericin from Daba and Modal cocoon cooking waste water and its characterisation.	7.52*

					submission.		
2.	PIB 04009 SI	Evaluation of identified hybrids of *Terminalia arjuna* × *T. tomentosa* and drought tolerant *T. arjuna* for their suitability in different tropical tasar silkworm rearing regions.	Oct, 2021	Sep, 2026	Vegetative propagation of test materials. Transfer of saplings to rooting mixture. Study on sapling vigour of test entries. Transplantation of 10 saplings each to Pot for potted study at CTRTI, Ranchi.	The test tasar host plant hybrids and accessions will be propagated through soft-wood (juvenile) stem cuttings for root initiation in polythene packets with sand. Rooted cuttings will be transferred to rooting mixture for sapling development. Well-developed saplings of test entries will be assessed for root proliferation and sapling vigour parameters. Establishment of saplings in pots for moisture stress studies.	52.98
3.	MOE 04014 MI	Evaluation and popularization of improved technologies developed in the field of tasar sector for central and north India (On Station/Farmer Trials of CTRTI) A. On Station Trial of technologies developed by CTR & TI, Ranchi	Feb, 2022	Jan, 2024	1. Evaluation of cocoonase variant for cocoon softening/degumming and silk surface modification 2. Evaluation of IPM for control of gall fly 3. Evaluation of PSB for qualitative and quantitative improvement in tasar food plant leaf 4. Validation of chemical trap for	Softening of cocoons with original colour and luster of tasar yarn Validation of IPM package for control of gall fly infestation in tasar food plants Observation of qualitative and quantitative improvement in tasar food plant leaf Identification of suitable chemical	14.50 (A+B) 11.25 (A)

					Ichneumon wasp 5. Evaluation of IPM for control of stem borer in tasar food plants 6. Establishment and popularization of new improved accession 102 and 123 of *Terminalia arjuna* and *Lagerstromia speciosa* 1.Management of abiotic factor using light reflector paints to reduce erratic and delayed emergence 2. Validation and popularization of cooking package developed for three eco-races.	trap for control of Icheneumon fly Validation of IPM package for control of stem borer in tasar food plants Validation of improved accession 102 and 123 of *Terminalia arjuna* and *Lagerstromia speciosa* for tasar silkworm rearing Reduction in erratic and delayed emergence after applying light reflector paints Validation of cooking package developed for three eco-races.	3.5 (B)
		B. On farm validation of technologies developed by CTR & TI, Ranchi 2020-21					
4.	PPA 04010 CN	Region and season specific selection of pruning and brushing schedule for tasar food plants and silkworm protection	Feb, 2022	Jan, 2025	Procurement of instruments, chemical and fertilizes Preparation of field and selection of food plants for experiment Selection of suitable pruning date for first crop Recording of ecological data. Recording of agronomical data Recording of pest and disease data. Selection of suitable pruning date for second crop and third crop. Selection of suitable brushing date for first crop and second crop (BV & TV)	Region and season wise suitable pruning and brushing schedule for low pest infestation and higher crop yield. Estimation of GDD requirement for different stage of silkworm and optimum production of leaf from pruning date.	32.60
5.	ARE 04011	Diversity, yield loss and	Feb, 2022	Jan, 2025	Procuring of equipment and	Purchase of requirements,	13.90

	MI	management of predatory wasps attacking *Antheraea mylitta* Drury			consumables, recruitment of project assistants. Multi-locational surveying for predatory wasps during first crop and second crop. Preparing specimens for morphological identification, morphometrics of wasp species and pictorial documentation.	recruitment of project assistants. Species diversity of the wasps occurring in tasar culture and their documentation and identifying total number of species after taxonomic studies.	
6.	ARP 04012 SI	Developing ectomycorrhizal bio-inoculants for improving survival and leaf yield of *Terminalia arjuna* and *Terminalia tomentosa*	Feb, 2022	Jan, 2026	Procuring of equipment and consumables, recruitment of project assistants. Isolation and purification of ECM fungal cultures. In vitro evaluation of PGPR activity of the ECM fungi. In vitro evaluation of nutrient mobilization/ uptake by fungal cultures.	Purchase of equipments, recruitment of project assistants. Axenic cultures of ECM fungi. Preliminary set of PGPR attributes. Final screening and short listing of fungal cultures and molecular identification.	10.15
7.	CYR 04013 MI	Studies on storage practices of tropical tasar cocoons for better cooking efficiency, reeling parameters and yarn quality	Feb, 2022	Jan, 2024	Assessment of single cocoon parameters and reeling performance for green, stifled and stored tasar cocoons in 3 to 18 months interval. Effect of cold storage preservation on single cocoon parameters and reeling performance. Assessment of change of sericin and fibroin characteristics due to storage of cocoons.	Assessment of single cocoon parameters and reeling performance for green, stifled and stored tasar cocoons in 3 to 18 months interval. Effect of cold storage preservation on single cocoon parameters and reeling performance. Assessment of change of sericin and fibroin characteristics due to storage of cocoons.	14.00
At nested units: NIL							

Annex- 4.I.2

1.1.2 Projects to be concluded during the year 2022-23

#	Code	Title	Start	End	Project Outcome	Utility of out-put/Impact on silk industry	Financial (Rs. In lakhs)
At main institute							
1.	AIB-4717	Improvement of tropical tasar silkworm *Antheraea mylittta* D for high silk yield through recurrent Selection	Oct, 2016	Sep, 2022	Improved line of tropical tasar silkworm Daba BV with high silk yield.	This will create a regular reservoir of high yielding ruling Daba from the recycle technology. The reservoir will be utilized for formation of foundation stock of any breeding program The retrieval of stock will serve the need of P-4 to cater to P-3 under integrated seed supply system. Additionally, the recycled and retrieved stock will serve to support the replenishment program of Daba BV of various BSMTCs. Further , this reservoir may also be useful for any replenishment of PPCs and NGOs as per need This project will help in developing high yielding Singhbhum Daba (HYSD) through recurrent selection. The breeding program of recurrent selection will utilize the foundation stock for developing high silk yield improved stock/line out of	1.93

						Daba BV. Since the whole tasar silk Industry of the country is based on Daba BV, this will cater the need by new breed.	
2.	APS-04003 SI	Studies on the reproductive potential of tasar silkworm *Antheraea mylitta* D with special reference to nutritional and mechanical indices	Mar, 2020	Feb, 2023	Application of soil nutrients. Rearing of silkworm on treated host plants Collection of plant extracts Evaluation of different ovipositional devices. Data collection on eggs laid, retained and hatched out.	Evaluation of nutrients, plant extracts and oviposition devices on fecundity of tasar silkworm.	4.5
3.	AIE-04004 CN	Study on existence of tropical tasar silkworm ecoraces and their subsist places with the help of geospatial technology.	Mar, 2020	Feb, 2023	The present research project on tropical tasar silkworm, *Antheraea mylitta* will lead to make a complete documentation of its diverse ecoraces and econiche distributed at various region of India. This study will provide invaluable information on population structure, speciation, gene flow and genetic variability of tasar silkworm and offers an explanation on insect diversity based on their interaction with environmental factors. This study will certainly yield some new ecoraces of *A. mylitta* that could be used in	Present status of distribution of tropical tasar silkworm ecoraces and its core zone in the forest will be identified and utilized for implementing appropriate *in-situ* conservation. This study would yield some new ecoraces of *A. mylitta* that could be used in breeding programme for the improvement of tasar silkworm. Spatiotemporal Fusion of Multisource Remote Sensing Data and GIS of tropical tasar silkworm and its food crops integrated SILKS dashboard will become a source of single window	18.74 (CTR&TI: 9.88 NESAC: 8.86)

					breeding programme for the improvement of tasar silkworm. Through remote sensing data and application of GIS, population structure and future probable change patterns can be ascertained.	information for tasar seri-farmers/tribal.	
4.	BPC-04005 SI	Tasar Silkworm Waste to Wealth by Cordyceps	Mar, 2020	Feb, 2023	Biochemical analysis of the fruiting bodies and mycelium. Development of cost effective technology	Cordyceps produced on muga and eri silkworm will be analysed biochemically and cost effective technology for each refuse will be developed for mass production of cordyceps.	9.2
5.	ARE-04006 CN	Management of important pests of tasar silkworm *Antheraea mylitta* (D) through botanical repellents	Apr, 2020	Mar, 2023	Determination of ETL for Uzi fly Olfactometer bioassay of botanical repellents against uzifly	Computation of ETL Screening of effective botanicals agaist Uzifly.	6.25
6.	MOE-04007 EF	Establishment of Biotech-KISAN Hub at Professional Assistance for Development Action (PRADAN), Deoghar, Jharkhand for three Aspirational Districts of Jharkhand (Godda, Dumka and Pakur).	Mar, 2021	Feb, 2023	Introduction of the improved technologies and practices to push the productivity frontiers for accelerated growth.	Sustainment of the Producer Organization and ecology regeneration, integrative value chain and leverage market through women farmers.	103.07*
At nested units							

*DBT funded project

Annex- 4.I.3

1.1.3 New Projects to be initiated during the year 2022-23

#	Code	Title	Start	End	Objectives	Expected outcome	Financial (Rs. In lakhs)
At main institute							
1	Project uploaded on e-proMIS website of DBT New Delhi (Subject to approval by DBT)	Unraveling of genes responsible for productive traits of tasar silkworm *Antheraea mylitta* using functional genomics approach.	2022	2025	To analyse the differential gene expression and unravel the pathways linked to fecundity and shell weight. To validate the gene responsible for fecundity and shell weight.	The outcome of the project will lead to explore the useful information on gene coding regions of *A. mylitta* with an aim to annotate and use available reference genome sequence for genetic characterization and functional genomic approach. This will be helpful to study the gene expression pattern, induction and regulation of genes related to qualitative and quantitative characters to enhance the productivity of tasar silk. Based on this, the hermos ee molecular basis of different economically important traits of *A. mylitta* can be analyzed.	62.64*
2	Project uploaded on e-proMIS website of DBT New Delhi (Subject to approval by DBT)	Development of KASP based SNP barcoding system for the molecular identification of tropical Tasar silkworm ecoraces	Apr 2022	Mar 2024	To perform extensive interspecific SNP screening and designing of KASP probe and primers. To validate the optimized ecorace specific KASP markers with all the available *A.*	KASP based SNP barcoding system for the specific identification of various *A. mylitta* ecoraces. The anticipated product of this proposed project is KASP based SNP barcoding	34.1

					mylitta ecoraces from various locations in India.	system to discriminate the A. mylitta ecoraces, which would be a significant molecular tool for establishing an efficient in-situ conservation strategy to overcome inter-crossing of ecoraces and the optimized KASP technology would be utilized further for marker-assisted selection (MAS) in systematic breeding programme to enhance the production of tasar.	
3	Project uploaded on e-proMIS website of DBT New Delhi	Inhibition of multiplication of pebrine spores in tasar silkworm through specific inhibitors	2022	2025	To reduce the multiplication of Pebrine infection in tasar culture	Development of package and practices for reduction of pebrine spores	30.19*
4	Approved in RAC	Establishment and Characterization of Novel Stable Cell Lines from Tropical Tasar Silkworm, *Antheraea mylitta*	April 2022	March 2025	To establish various primary and continuous cell lines of tropical tasar silkworm. To characterize the established continuous cell lines. To analyse the susceptibility of cell lines to *N. mylitta* and AmCPV. To analyse the suitability of cell lines for the expression of foreign genes.	Tropical tasar silkworm's continuous immortal cell lines would be established. *N. mylitta* and AmCPV susceptible cell lines would be established for performing various pathological researches. Established *A. mylitta* cell line for conducting various heterologous gene expression studies.	130.0

5	RAC approved	Pheromone/ kairomone based traps for vanya silkworm pest management	2022	2025	Isolation and characterization of pheromones and kairomones Assessing the electrophysiological and behavioural assay Assessing the efficacy of the semiochemicals under field conditions	Expected outcome would be development of pheromone/kairomone trap to manage the major parasitoids of vanya silkworms. Developed trap can be effectively utilized for the management of uziflies and yellow fly in both tasar and muga culture and it will greatly helps to reduce the crop loss due to these pests.	44.26*
6	Suggested by RAC (Phase - III of the project AIT 04002 SI)	Stabilization and Multiplication of Thermo-Tolerant Line(s) of Tropical Tasar Silkworm *Antheraea mylitta*	2022	2025	To stabilize thermo-tolerant line(s) of tropical tasar silkworm, *Antheraea mylitta.* To screen and validate the SSR markers for Marker Assisted Selection of thermo-tolerant line(s). To conduct multi-location trial of stable thermo-tolerant line(s) in tasar rearing hotter zones.	The selected stable thermo-tolerant lines could be multiplied further at RECs and BSM&TCs and utilized at farmers' level in hotter zones like Chhattisgarh, Maharashtra, Telangana, Andhra Pradesh and Orissa. Validated SSR markers would be useful for the specific selection of thermo-tolerant lines. The molecular mechanism of heat stress response and thermotolerance will be deciphered and the information will be useful to identify genotypes that withstands higher temperature in the environment.	44.10
7	RC approved (As decided in	*In-situ* conservation of economically	2022	2027	To collect wild cocoons of Sarihan, Laria, Raily, Baraf,	The tropical tasar silkworm ecoraces viz.	750.00

	AAP_2022-23 meeting).	important tropical tasar silkworm ecoraces			Modal, JataDaba, Bhandara and Andhra local ecoraces from their ecological niche. To strengthen the core zone and preserve the cocoons in pagoda device in their natural habitat. To release the eggs and exploration of new ecopockets for conservation. To involve VSSs, TVSs, VFCs, JFCs and NGOs in conservation programme.	Sarihan, Laria, Raily, Baraf, Modal, JataDaba, Bhandara and Andhra local would be conserved in their respective natural habitat for the future generation and tribal welfare. The genetic diversity and allelic structure of populations would be maintained with minimizing the chance of genetic erosion through successful conservation of tasar ecoraces. The conservation of tasar silkworm ecoraces will leads to sustainable utilization of natural resources, as they contribute to rural /tribal socio-economic and cultural heritage. The conservation of tasar silkworm wildlife is not only sustaining its population and income of tasar rearers, but also augments the other endangered flora and fauna in the wild by default.	
8	RC approved (As decided in AAP_2022-23 meeting).	Tasar silkworm disease and its management	2022	2027	To ensure quality DFL production To study other disease apart from pebrine in field and grainages To enforce disease	Disease forecasting models in the field and graianges will be developed which helps in decision making.	85.00

					management module in the tasar industry. Development of decision support system for forewarning silkworm disease and its management practices.	To build confidence in private seed production units so as to produce quality DFLs & minimize the burden on Government seed production units.	
At nested units: NIL							

1.2 With CI from the Institute (Collaborative projects with other CSB Institutes)

Annex- 4.I.4

1.2.1. Projects of earlier year continued through the year 2022-23

#	Code	Title	Start	End	Milestone to be crossed	Progress to be achieved	Financial (Rs. In lakhs)
At main institute: NIL							
1.	MEO-09001 MI	Evaluation of Technologies developed for Seed Production Improvement	Jan, 2022	Dec, 2023	Procurement of Tasar seed cocoons, preparation of seed and rearing of seed. BTSSO and CTR&TI. To test the efficacy of seed preservation technology with few dfls seed preservation and bioassay work will be carried out at BTSSO. Execution of grainage and rearing at different units of BTSSO and CTR&TI Preservation of seed cocoons.	Performance of seed preservation technology will be known and it can be utilized perfectly while conducting second trial.	1.0
At nested units: NIL							

Annex- 4.I.5

1.2.2. Projects to be concluded during the year 2022-23

#	Code	Title	Start	End	Project Outcome	Utility of out-put/Impact on silk industry	Financial (Rs. In lakhs)
At main institute							
1	BPS-01013 CN	Utilization and diversification of silkworm pupae products	Sep, 2020	Aug, 2022	Nutritional profiling of tasar pupae. Isolation and	Development of fish feed (In collaboration	5.90

		for human & animal consumption and composting			characterisation of Chitin and chitosan. Identification of antioxidant molecules in tasar pupae.	with CIFRI)	
2	AIT 08006 EF	Development of lateral flow assay (LFA) kit for diagnosis of pebrine disease in silkworms.	Mar, 2021	Aug, 2022	Identification of essential genes from Nosema infecting *Antheraea mylitta* and *A. assamensis* will help us understand the various genes expressed during infection.	The developed LFA would be of great need in next generation diagnostic market as use of new strategies like silver enhancement technology or combinations of GNPs with an enzyme help in catalytic amplification of the signal which makes them reproducible and sensitive.	-
At nested units: NIL							

Annex- 4.I.6

1.2.3. New Projects to be initiated during the year 2022-23

#	Code	Title	Start	End	Objectives	Expected outcome	Financial (Rs. In lakhs)
At main institute: NIL							
At nested units: NIL							

2. Transfer of Technology (ToTs) Programmes to be carried out during 2022-23

Annex- 4.II.1

2.1 On Station Trials (for validation of technology at CSB institutes/ RSRSs/ DoS units etc.)

#	Name of the Technology	Unit Cost (Rs.)	At CSB institutes	RSRSs	DOS Units/ Producer institution (PI)	Total No. of trials	Budget (Rs. in Lakhs)	Anticipated Impact
1	Evaluation of cocoonase variant for cocoon softening/ degumming	16000	CTR &TI, Ranchi	REC Seoni-Champa & REC Kapistha	DoS: JSDI, Hehal (JH). PI: Letwa village of Katoria block in Banka (BI), Ranabandh village of	06	--	Softening of cocoons with original colour and luster of tasar yarn

	and silk surface modification				Portaiyahaat block in Godda (JH)			
2	Evaluation of PSB for qualitative and quantitative improvement in tasar food plant leaf.	12000	CTR&TI, Ranchi	RSRS : Baripada, Jagdalpur & Dumka	PI: Satbandh and Bara village of Poraiyahat block, Godda District (JH) & Phitkoria and Bara Bhaki village of Kathikund block, Dumka District (JH)	08	--	Observation of Qualitative and quantitative improvement in tasar food plant leaf
3	Validation of chemical trap for Ichneumon wasp	37000		BSMTC Ambikapur, Chinoor, Bhandara & Kharswan	PI: Kuchai block of Saraikella-Kharswan District (JH)	05	--	Identification of suitable chemical trap for the control of Icheneumon fly
4	Evaluation of IPM for control of gall fly	4500		RSRSs: Baripada, Bhandara, Jagdalpur, Dumka & Warangal. RECs: Seoni-Champa, Kapistha & Chakradharpur. BSMTC: Kharswan & Khatikund	PI: Poraiyahat block of Godda District (JH) & Kuchai block of Saraikella-Kharsawan district (JH)	12	--	Validation of IPM package for control of gall fly infestation in tasar food plants
5	Evaluation of IPM for control of Stem borer in tasar food plants	20000		RSRSs: Baripada, Bhandara, Jagdalpur, Dumka & Warangal. RECs: Seoni-Champa, Kapistha & Chakradharp ur. BSMTC: Kharswan & Khatikund	PI: Katoria block of Banka District (BI)	11	--	Validation of IPM package for control of stem borer tasar food plants
6	Establishment and popularization of New Improved accession102 and 123 of *Terminalia arjuna* and *Lagerstromi a speciosa*	10000			Dos: 2 PPC/TRC in each Jharkhand, Odisha, Chhattisgarh Maharashtra state PI: Manjhgoan block of West Singhbhum District (JH), Kathikund block of Dumka District (JH) & Poraiyahat block of Godda District (JH)	11	--	Validation of improved accession 102 and 123 of *Terminalia arjuna* and *Lagerstromia speciosa* for tasar silkworm rearing
7	Evaluation of egg washing and disinfection machine	30000		BSMTC : Madhupur, Kathikund, Kharsawan, Bilaspur, Pali, Boirdadar, Balaghat, Chennur, Kendujhar, Bhandara		10	--	Validation of egg washing and disinfection machine
						63	**10.61***	

Note: *The amount for OST will be utilized through Project Code: MOE 04014 MI.*

Annex- 4. II.2

2.1 On Farm Trials (for demonstration of Technologies at farmers' level)

#	Name of the Technology	Unit Cost (Rs.)	No. of locations	Cost (Rs. Lakh)	No. of stakeholders
1	Validation and popularization of cooking package developed for three eco-races	25000	05 1) REC/ Reeling Unit of DOS, Seoni-Champa, (CG) in association with Silk Technological Service Centre, Bilaspur (CG) 2) Reeling Unit of DOS, Bhagamunda Odisha in association with Silk Technological Service Centre, Cuttack Odisha. 3) Reeling Unit of DOS, Bhagaiya, Jharkhand/Bihar in association with Silk Technological Service Centre, Bhagalpur, Bihar. 4) Reeling Unit of DOS, Tantipara, Suri in association with Regional Silk Technological Research Station, Malda, West Bengal. 5) Producer Institution (Through PRADAN/ TDF) Ranabandh village of Poraiyahat block in Godda District Jharkhand.	--	90
2	Management of abiotic factor using light reflector paints to reduce erratic and delayed emergence	25000	06 03 locations at PPC/TRCS (i.e. PPC Bengabad, TRCS Chandua, & TRCS Bisoi). 03 locations at BSPU-Producer institution through PRADAN/TDF (i.e. BSPU-Bajrisol, BSPU- Dharophata Grainage of Poraiyahat block in Godda District & Sahritola gainage of Kathikund Block Dist.Dumka Jharkhand).	--	06
			11	**--**	**96**

Note: *The amount for OFT will be utilized through Project Code: MOE 04014 MI.*

Annex- 4. III

3. A. Capacity Building & Training programmes to be carried out during 2022-23

#	Title of the training programme	As per CO, Bangalore	Proposed CTRTI, Ranchi	Target		
		Unit cost (Rs.)lakh	Unit cost (Rs.)lakh	Physica (No.)	No. of stakeholder	Financial (Rs. in lakhs)
3.1	Structured Training Course*					
3.1.1	PGDS	3.00/batch	3.00/ batch	1	20	3.00
3.1.2	Intensive Sericulture Training					
3.2	Farmers Skill Training	0.045	0.030	31	774	23.22
3.2.1						
3.2.2						
3.3	Exposure visit for technology awarenes$	0.040	0.030	9	180	5.40
3.4	Technology Orientation Programme	0.038	0.038	02	50	1.90
3.5	Sericulture Resource Centres (SRCs)	0.0075	0.005	20	300	1.50
	Establishment of New SRC	1.25/SRC (Capex)	1.25/SRC (Capex)	01	50	1.50
3.6	Training under Post Cocoon Sector**					
3.6.1						
3.6.2						
3.6.3						
3.7	Management Development Programme under STEP				52	
3.8	Training for Adopted Seed Rearers (ASRs)					
3.9	Training to Registered Seed Producers (RSPs)					
3.10	Training on Seed Act					
3.11	Other Need Based Training Programme					
3.11.1	Trainers Training Programme for KVK Scientists	0.0975	0.0975	01	24	2.34
3.11.2	Hands-on training programme on Statistics for Scientists	0.100	0.0615	01	27	1.66
3.11.3	Competency Enhancement Training Programme (CETP) for Incharge Scientist/administrative staff and Technical staff of institute and its nested units$$$	0.100		01	50	1.396
	Refresher training on technological advancement in sericulture and extension approaches under CEPT programme for STA/FA of CTRTI & BTSSO and its nested units	0.100	0.100	01	25	2.5

3.12	**Non-CBT:** Training programme funded by agencies other than CSB*					
3.12.1						
3.12.2						
3.13	**Training under SAMARTH** ***					
3.13.1	Pre-cocoon (Silkworm rearing)					
3.13.2	Post cocoon – Silk (Reeling, Spinning, Wet processing)					
3.13.3	Post cocoon – Handloom (Designing & Weaving)					
	Total			**68**	**1552**	**44.416**

$ Average per farmer is 2500/- for nested units and Rs.4000/- for new developmental partners of the Forest Department
$$ Includes travel costs & Rs. 50/- per farmer by personnel
$$$ CEPT programme for 50 trainees on" Imparting functional knowledge on administrative, accounts, establishment and stores related works for CTRTI, Ranchi and its nested units" has been conducted w.e.f.11-04-2022 to 13-04-2022.

B. Capacity Building & Training programmes to be carried out during 2022-23 (KVK)

	Training Location	**CTRTI-Ranchi** (Accomodation : Institute Hostel)
	No. of participants	**24**
#	**Items/ Heads of Expenditure**	
A	**Boarding & Lodging charges for participants**	
1	Lodging x 6 days [Rate varies according to location]	36,000.00
2	Boarding [Breakfast, lunch, dinner, session tea/coffee & snacks (twice) @ Rs. 800/- per day	1,15,200.00
	Sub-Total - A	**1,51,200.00**
B	**Training expenses**	
1	Stationery, photocopying, Sanitizerr, mask etc @ Rs. 150/- per person	3,600.00
	Sub-Total - B	**3,600.00**
C	**Faculty fee**	
1	Rs. 500/- per session for internal faculties x 18 sessions	9,000.00
2	Programme co-ordinators fee: Rs. 250/- per day x 2 co-ordinator x 5 days	2,500.00
	Sub-Total - C	**11,500.00**
D	**Transportation**	
1	Train/ Road travel and other transit expenses for participants @ Rs. 2000 /- per person	48,000.00
2	Local conveyance, Taxi/ Bus hiring charges etc [for CSB institutes only]	15,000.00
	Sub-Total - D	**63,000.00**
E	**Miscellaneous and contigencies**	
1	Inauguration & Valediction , awards and other sundry expenses	5,000.00
	Sub-Total - E	**5,000.00**
	Total [A to E]	**2,34,300.00**

Note:
**Training Kit & Certificate Printing @ Rs. 250 per person, may be met from GIA Fund [Head: Training]*
***Training Material & Module will be supplied from CO-Bengaluru*
****TA/DA for one nominated programme Co-ordinator from CO (CBT Division/ RCS Section), may be met from GIA Fund [Head: Training]*
*****Travel Cost is to be restricted to 2AC train fare or actual bus / Train fare, whichever is lower*

Annex- 4. IV

4. Extension Communication Programmes to be conducted during 2022-23

#	Programmes	Unit cost (Rs.)	Fund utilized (Rs. In lakhs)	No. of events					No. of stakeholders to be sensitized				
				I Qtr	II Qtr	III Qtr	IV Qtr	Total	I Qtr	II Qtr	III Qtr	IV Qtr	Total
4.1	Krishi Mela- Main institute	3.00	**3.00**	-	1	-	-	**01**	-	200	-	-	**200**
	Krishi Mela / Reelers Mela cum exhibition	1.5	**9.00**	-	-	06	-	**06**	-	-	1200	-	**1200**
4.2	Farmers /Field day	0.10	**3.60**	-	18	18	-	**36**	-	900	900	-	**1800**
4.3	Awareness programme	0.05	**1.40**	4	10	10	4	**28**	100	250	250	100	**700**
4.4	Technology demonstration / Enlightenment programmes	0.01	**0.40**	10	10	10	10	**40**	200	200	200	200	**800**
4.5	Workshop / Seminars & Conferences	2.00	**12.00#**	02	-	02	02	**06**	200	-	200	200	**600**
4.6	Other activities												
	Total		**29.40**	**16**	**39**	**46**	**16**	**117**	**500**	**1550**	**2750**	**500**	**5300**

Note: i) Krishimela at RSRSs 150-200 farmers at Rs. 1.5 lakh per event
Convergence with DOSs regarding ecorace conservation and other issues.

Particulars	*Krishi Mela/ Reelers Mela cum exhibition*	*Farmers Field day*	*Awareness programme*	*Technology demonstration / Enlightenment programmes*	*Workshop/ Seminars & Conferences*
No. of farmers	*400-500*	*50-100*	*50-100*	*20*	*100*
Unit cost (Rs. Lakhs)	*3.00*	*0.07-0.15*	*0.05-0.10*	*0.01*	*2.00*

Annex -4.V

5. Soil samples analysis to be carried out during the year 2022-23

#	Item	Target (No.)	Financial (Rs. In lakh)
1	Soil analysis for fertilizer recommendation	200	0.70
	Total	**200**	**0.70**

Annex -4.VI

6. Information, Education and Communication

#	Item	Target (No.)	Financial (Rs. In lakh)
A			
6.1	Periodicals	3	
6.2	Publications		
6.2.1	Research papers-National	8	
6.2.2	Research papers-International	5	
6.2.3	Proceedings/ Abstracts	10	
6.2.4	Books/ Book Chapters/ Manuals etc.	1	
6.2.5	Popular Articles	10	

6.2.6	Booklets, Brochures etc.	3	
6.3	Extension literature	4	
6.4	Films/ Videos	3	
6.5	Social media	200	
Total		**47 +200**	**5.00**
B			
1.1	Library (Book/Journal/ Online Journal Subscription Charges)	--	**1.50**
Grand Total			**6.50**

Annex-4.VII

7. Patents to be filed/ granted and Technologies to be Commercialized

#	Item	Details	Financial (Rs. In lakh)
7.1	**Patents to be filed**		
7.1.1	Sericin prototype Unit	Prototype unit will be useful for isolation of sericin from tasar cocoon cooking waste water	1.0
7.1.2	Cordyceps mass production protocol	Process patent of mass production of *Cordyceps militaris* on tasar silkworm refuses	1.0
7.1.3	Cocoonase	For softening of tasar cocoons to improve reelability	1.0
7.2	**Patents to be granted**		
7.2.1			
7.3	**Technologies to be commercialized**		
7.3.1	Egg washing cum disinfection machine	Proposed machine to be supplied (30 numbers) to various CSB/DOS/ Community seed production units for tasar egg washing cum disinfection	10.0
7.4	**Software, mobile/android app developed etc.**		
7.4.1			

Annex -4.VIII

8. Revenue Generation for the year 2022-23

#	Source of Revenue Generation	Physical (No.)	Revenue to be generated (Rs.)
7.1	**Patent (Technology)**		
7.1.1	License Fee collected		0.50
7.1.2	Royalty collected		
7.2	**Testing & Analytical charges (Sample)**		
7.2.1	Testing of Soil/water/FYM/ Leaf etc		
7.2.2	Quality analysis/ testing of products		
7.2.3	Testing of cocoons/silk yarn/fabric etc.		
7.3	**Consultancy (Services)**		
7.4	**Supply/ sale proceeds of cutting / Sapling/ seedling/**		

	hawki worms/ cocoons/ Silk etc.		
7.4.1	Mulberry cutting		
7.4.2	Vanya host plant sapling/ seedling		0.10
7.4.3	Mulberry chawki worms		
7.4.4	Mulberry seed (DFLs)		
7.4.5	Vanya DFLs		
7.4.6	Cocoons		2.00
7.4.7	Output from R&D Projects (Silk, fabric etc)		1.00
7.4.8	Others (pl specify)		
	Licence fees of Quarters and Hostel rent		5.00
	Recovery of loans and advance		2.50
	Refund of advance deposits		2.00
	Rent & Hiring Charges/Electricity		4.00
	Sale of miscellaneous		4.00
	Interest/ Penalty		0.40
	Previous year recovery		3.50
	Total		**25.00**

Annex-4.IX

9. Procurement of equipments and other accessories

#	Equipment/other requirement	Quantity	Justification	Approx. price (Rs. in lakhs)
Equipments under CSB coded projects				
1.	Fluorpen with 10 pcs set of detachable leaf-clips	01 no.	For recording of fluorescence in response to drought stress (PIB 04009SI).	2.25
2.	Hot Air Oven, Laboratory	01 no.	Cocoon testing and other purpose (CRY 04013MI).	1.40
3.	Weather Tracker	31 nos.	Study of micrometeorological parameters in relation to protection & production of tasar cocoons (PPA 04010CN).	15.50
4.	Dry & Wet bulb thermometer	31 nos.	Recording of temperature and relative humidity in grainage (PPA 04010CN)	0.50
5.	Light traps with Insect collection Chamber	10 nos.	For collection of adults stem borer and other harmful pest of food plants during rainy season (MOE 04014MI).	1.0
6.	Insect Traps	150 nos.	Use as a chemical trap for control of yellow fly (MOE 04014MI).	1.10
7.	Microprocessor based vertical autoclave	01 no.	For carrying out research work of the project (ARP 04012SI).	1.50
8.	Autopipette 1-10 ml	01 no.	For carrying out laboratory work under the project (ARP 04012SI).	0.20
9.	BOD Incubator with shaker and illumination control-250-280 L capacity	01 no.	For carrying out research work of the project (ARP 04012SI).	2.50
10.	Stereo microscope enabled with	01 no.	Species diversity and taxonomical studies of host plants and silkworm pests (ARE	6.00

	computer imaging		04011MI).	
	Sub Total			31.95*
Equipments /Assets other than projects				
	At main institute			
1.	Millipore water purification System	01	There is only one Millipore water purification equipment at the Institute which is 12 years old and presently not working and it is not repairable. Its capacity required is 2 lit/hr. As for various molecular and biochemical analyses high grade purified water is needed, this equipment is one of the basic requirements.	7.00
2.	-80° Deep freezer	01	Total Two working deep freezers are available at the Institute. One is 14 year old and has earlier gone out of order. The other one is 01 year old. Deep freezer available at Institute is full with various samples. For proper storage of various chemicals and genetic resources as well as biological samples is very much needed Hence one more Deep freezer is required, in case of breakdown of the old deep freezer to preserve the sample safely.	6.00
3.	High precision Electronic balance	01	Only one Electronic balance is available in the section which is 14 years old, and not working properly. High precision balance is needed for accuracy of various experiments.	0.95
4.	BOD Incubator	01	BOD Incubator having 200 lit capacity available in section is 12 years old and presently not working/unserviceable. Various biological samples and cocoons are required to be maintained at specific temperature.	2.00
5.	Sonicator	01	For Cell lysis.	4.50
6.	Table top pH meter	01	Preparation of chemical solutions for biochemical analysis.	0.70
7.	Cooling centrifuge	01	Isolation of cellular Particles from a suspension.	5.00
8.	Horizontal Laminar air flow chamber	01	There is only one Horizontal Laminar air flow chamber in the institute which is more than 30 years old (purchased in 1991) The instrument is being used for the cordyceps project and other microbiology and biotechnology related works of other projects in the institute and remain occupied most of the times resulting into delay in assigned works. Separate flow chamber required for work related to environmental (soil) and biological samples (plant, silkworm, fungal fruiting bodies collected from natural conditions, etc.) to avoid contamination to other molecular and pure culture related work.	1.50
9.	Workstation with	01	Workstation is very much essential to	15.00

	Specification *Processor:* Intel Xeon Gold *Number of cores/processor:* 24 *RAM size:* 256 GB *RAM Expandable upto:* 1024 GB *SATA Drive Capacity:* 6 TB *Graphics Card:* 16 GB *Display Resolution:* 3840 x 2160		perform various analysis of both genomic and transcriptomic data viz., Genome annotation, linkage mapping, differential gene expression analysis, pathway enrichment, etc. Especially it is very much essential for performing SNP based genetic characterization within and between the ecoraces collected from various states all over India.	
10.	Table Top Mini Centrifuge RPM: 16,000	01	Required to perform DNA/RNA extraction and purification within the PCR workstation to avoid external contamination of nucleases.	1.00
11.	Oxford Nanopore sequencer with Flow cells and battery backup.	1 No.	Oxford Nanopore is a portable high-throughput benchtop sequencer. Long nanopore sequencing reads (up to 4 Mb), provide novel and cost-effective insights into silkworm genomes, transcriptomes, and microbiomes, through the accurate resolution of complex genomic regions, haplotypes, and full-length transcripts. Nanopore sequencing allows the generation of novel insights into transcript isoform expression and usage across different experimental conditions and cells, including single-cell analysis in tropical tasar silkworm.	10.0
12.	Air Entrainment System	01	To be used for Volatile collection	6.00
13.	Demineralization water plant	01	For removal of ions from cocoon cooking waste water.	1.50
14.	Automatic Weather Station	01	To generate the meteorological data for development of Forewarning system	7.00
15.	Drone sprayer	01	For mechanization of spray/dusting of disinfectants, pesticides/ insecticides/ biocontrol agents on tasar food plants as per Govt. of India Agriculture Policy	10.00
16.	Drone (DJI Mavic 3) with image analyser	01	To record canopy development	5.00
17.	Bio shredder	01	For shredding of farm and other waste for fast degradation and composting	10.00
18.	Telescopic pole pruner	03	To prune the tasar host plant branches above 8 – 10 feet.	2.00
19.	Battery operated knapsack sprayer	02	To spray disinfectants, pesticides/ insecticides/ biocontrol agents on tasar food plants.	0.70
20.	Rotary tiller (3' width)	02	To do cultural operations like weeding basin (ring) making, pruning, top clipping, spraying of disinfectants etc. through Agrimate farm implements for with reduced drudgery and timely disposal of farm activities for tasar plot	5.00

			maintenance.	
21.	Automatic weather tracker (Kestrel)	01	To record and maintain the meteorological data of the farm to moniter and forewarning the disease and pest incidence in tasar food plants.	0.55
22.	Farm Mechanization equipments		For mechanization of farm activities in main Institute	10.00
23.	Farm Mechanization equipments		For mechanization of farm activities in the nested units	22.00 (11 units @ 2 lakh per unit)
24.	Steel Racks with mesh (cage) for tasar cocoons storage	04	Presently, two iron racks with mesh (cage) are being used for storage of tasar cocoons for reeling experiments. Two wooden racks (cage) available are totally damaged. Iron racks are also rusted and not in proper condition. So, for storage of cocoons after stifling/hot air drying, four stainless steel racks with mesh (cage) are required to avoid damage of cocoons during storage.	2.00
25.	Motorized Reeling cum Twisting Machine (MRTM)	01	The existing reeling, spinning and re- reeling machines available in PCT Section are very old and worn out condition. Hence, it will be not feasible to get them repaired. So, one set of each machine is required in PCT Section for project experimental studies, demonstration and training.	0.35
26.	Motorized Tasar Reeling Charkha (MTRC)	01		0.35
27.	Buniyaad Reeling Machine	01		0.15
28.	Motorized Spinning Machine (MSM)	01		0.15
29.	Motorized Re-Reeling Machine	01		0.25
30.	125 KVA Silent Back up-power generator	01	To replace the existing 180 KVA Back-up generator which is old, obsolete, consuming lot of fuel and causing heavy pollution.	20.00
31.	USB camera with integrated speaker phone for Video Conferencing System	01	For upgrading the existing Video Conferencing System which was set in 2017 and not working properly.	3.00
32.	**Digital Heating Cooling Dry Bath** Temp. Range: 4°C to 95°C Type: Dry Bath/Block Display: Digital Temp. Accuracy: 0.55°C at 37°C Temp. Stability: ±0.15 at 37°C **Accessories:** Block 0.5 ml: 48 places Block 1.5 ml: 30 places Block 15 ml: 15 places Block 50 ml: 6 places	01	Digital Heating Cooling Dry Bath is required to conduct various molecular experiments in tasar silkworm viz. DNA/RNA extraction, restriction, ligation, transformation, etc.	4.0

33	**Gel Imaging System** Field of view: 22.5 x 18.0-cm 9.1 MP cooled CCD camera. Five fluorescence channels. Green LED-based transilluminator. Smart Exposure technology. **Includes** Imaging Sample Blot, Preinstalled filter sets, Safe Imager Viewing Glasses, White Screen for stained SDS-PAGE gel analysis	01	Gel Imaging System is very much essential for Chemiluminescent Western Blot Imaging, DNA/RNA Gel Imaging, Fluorescent Western Blot Imaging, Protein Gel Imaging. Multiple image analysis to perform densitometry, quantitation, and normalization directly using the on-instrument software.	12.0
34	**CO2/LN2 Backup System** Temperature Range: -150°C to +1°C. Capacity: 3.1 cu. ft. Capacity (Metric): 88 L Defrost: Automatic Style: Free standing	1 No.	CO2/LN2 Backup System is highly imperative to maintain the temperature in ultra low-temperature freezers during power cut and help to overcome the loss of precious samples. System inject liquid CO_2 / LN_2 into cabinet when cabinet temperature warms to preset level.	2.5
	Sub Total			**178.15**
	Any Other item under Asset creation			
32.	Vehicle			10.0
	At nested units			
33.	Vehicle			10.0
	Sub Total			**20.0**
	Total			**198.15**

Annex -4.X

10. Other Activities to be taken up during the year 2022-23:

i. Conservation and popularization of local ecoraces in situ conditions : Rs. 9.09 Lakh
ii. Swachh Bharat Programme : Rs. 1.20 Lakh
iii. Production of vermicompost by each unit : Rs. 1.00 Lakh
iv. P-4 rearing and grainage and other activities : Rs. 1.35 Lakh
v. Oak Tasar preponed rearing, cocoons purchase and other activities : Rs. 4.37 Lakh
vi. Popularization of viable technologies : Rs. 3.28 Lakh
vii. Maintenance of Farm/ Plantation & TTP (Institute) : Rs. 6.25 Lakh
viii. Maintenance of Farm/ Plantation (Nested units) :Rs. 2.90 Lakh
ix. Adoption of farmers : Rs. 0.30 Lakh
x. Demonstration of viable technologies at KVKs : Rs.12.50 Lakh
xi. RMB activities : Rs. 43 Lakh*

**Rs. 43 lakh for RMB activities not included in the Annual Action Plan budget 2022-23*