

CTR&TI

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CENTRAL TASAR RESEARCH & TRAINING INSTITUTE

(ISO 9001 : 2008 Accredited Centre of Excellence)

*National Institute par excellence
devoted for
Upliftment of Tribal Populace through
Technological Empowerment
and Skill Development*

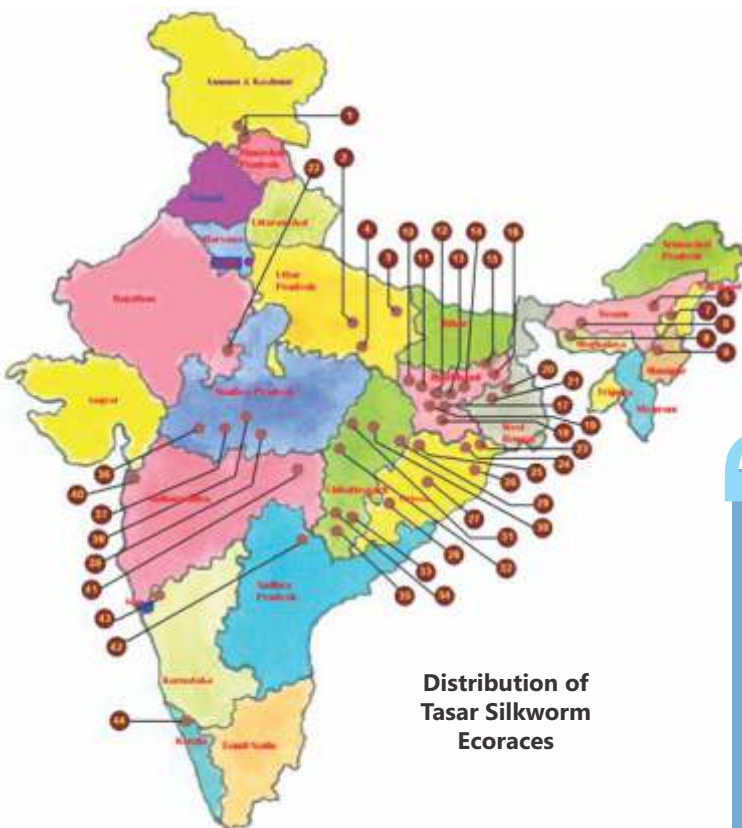


Tasar Culture - A tool for Tribal Development

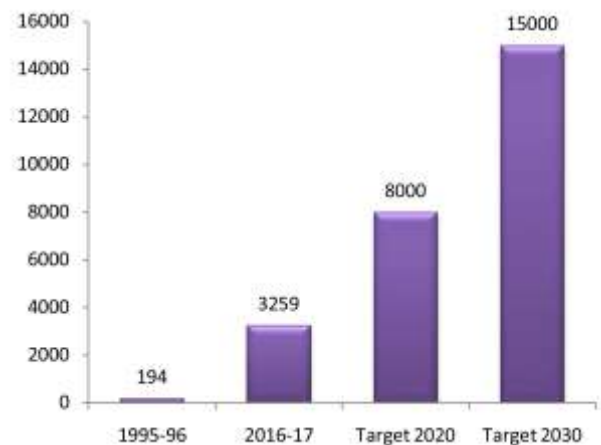
Silk is the most elegant textile in the world with unparalleled grandeur, natural sheen, and inherent affinity for dyes, high absorbance, light weight, soft touch and high in durability. Because of these unique features, silk is known as the "Queen of Textiles" the world over. On the other hand, it stands for livelihood opportunity for millions, owing to its high employment potential, low capital requirement and remunerative nature of its production. India has a rich and complex history in silk production and its silk trade dates back to 15th century. Sericulture industry provides employment to approximately 8.25 million persons in rural and semi-urban areas in India. Of these, a sizeable number of workers belongs to the economically weaker sections of the society, including women. India's traditional and culture-bound domestic market and an amazing diversity of silk garments with geographic specificity have helped the country to achieve a leading position in the silk industry. India has the unique distinction of being the only country producing all the five commercial exploited 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

Tasar Culture is practiced in the Central and Southern plateau region in the humid and dense forest areas covering States of Jharkhand, Chhattisgarh, Odisha, Madhya Pradesh, West Bengal, Andhra Pradesh, Maharashtra, Uttar Pradesh, Telangana and Bihar. Tasar culture is the way of life of many tribal families and forest dwellers in these States. It is estimated that about 3.0 lakh tribal families are engaged in Tasar activities. Jharkhand, the leading Tasar producing State provides employment to about 1.5 lakhs farmers in rearing, reeling & spinning and weaving sectors.

Due to technological interventions and massive extension drive by the Central and State Agencies, the steady increase in tasar raw silk production was recorded from the late nineties onwards. The tasar raw silk production which was recorded 194 MT during 1995-96 increased up to the level of 3259 MT in 2016-17. It shows a highly significant increase of 16.8 folds in last two decades. Jharkhand is the leading State with about 80% tasar silk production, followed by Chhattisgarh, Odisha and Madhya Pradesh.



Distribution of
Tasar Silkworm
Ecoraces



"If fashion is a fine art, then silk is its biggest canvas; and if silk is the canvas, then all its weavers, dyers, designers, embroiders are the greatest artists".

CTR&TI

Central Tasar Research and Training Institute (CTR&TI) is the flagship Research Institute catering to the R&D need of tropical and temperate (Oak) tasar sectors. The Institute was established in Ranchi in 1964 under the administrative control of Central Silk Board, Ministry of Textiles, Govt. of India for carrying out the overall development of Tasar Silk Industry in the country. It is engaged in generating useful technologies through Research & Development and its effective transfer in the field, with an ultimate aim to improve the socio-economic status of the stakeholders associated with tasar industry. Besides carrying out research on different aspects of tasar culture of direct field applicability, it also undertakes research on molecular level to unearth certain intricacies of tasar silkworm for achieving higher productivity and quality.



Objectives

- i) To use the state-of-the-art technologies developed by the Institute for enhancing the productivity, quantity and quality in Vanya Silk Sector.
- ii) To develop excellence, skill and entrepreneurship for strengthening the Vanya Silk Industry.
- iii) To supply / provide quality, relevance and equity to rural education about Vanya silk through training and skill upgradation.
- iv) To provide quality life in rural population by taking up Tasar Culture as a source of income generation.
- v) Product diversification for catering the needs of the market.

Vision

To emerge as an International Research Organization *par excellence* for providing R&D support to Tasar Industry to increase productivity with quality at all the stages of tasar silk industry.

Mission

To transfigure the R&D efforts of the Institute for increasing production of quality Tasar Silk from present level (2016-17) of 3259 MT to 8000 MT by the year 2020 and 15000 MT by 2030, thereby increasing income generation of rural poor, especially the tribal populace associated with Tasar Industry.

Mandate and Activities

The Institute mandate is to serve as the National Institute to organize and promote Tasar silk industry through basic and applied research, extension and technology transfer and generation of trained human power in tasar industry. To fulfill its mandate, the Institute carries out following activities.

- i) Conduct of basic and applied research on tasar host plants and silkworms for improvement and optimization of output, and on post-cocoon aspects for increasing the rate of production and refinement in the process for quality yarn and fabrics.
- ii) Evolution, maintenance and supply of Breeders Stock.
- iii) Development of innovations for improved silkworm rearing, cocoon preservation and seed production.
- iv) Developing technologies for control of pests and diseases of host plants and silkworm.
- v) Demonstration, dissemination and popularization of the developed technologies through organizing various extension and motivational programmes and commercialization of products.
- I Generation of trained and skilled human resource to fulfill the need of tasar industry.
- vii) Coordination with the Department/Directorate of Sericulture of command States.
- viii) Extend consultancy services to different agencies and organizations.

Organizational Set-up

Presently, the entire gamut of Research & Development is being carried out by different sections of the Institute namely, Soil Science & Chemistry, Plant Breeding & Genetics, Agronomy, Tissue Culture, Plant Pathology and Farm Management related to Tasar Host Plant. Similarly, for Tasar Silkworm improvement and productivity, different laboratories involved are Silkworm Breeding & Genetics, Silkworm Physiology & Biochemistry, Silkworm Biotechnology & Molecular Biology, Silkworm Pathology & Microbiology, Silkworm Seed Technology, Silkworm Rearing Technology and Entomology. The studies on Post-cocoon (Reeling & Spinning) activities are carried out by the Post-Cocoon Technology Division. The Institute is spread over in a total area of 37.48 ha, of which 25.37 ha are under host plant cultivation (*Terminalia arjuna*: 13.53 ha; *Terminalia tomentosa*: 8.75 ha; Germplasm Bank: 0.74 ha; Nursery: 0.35ha; Natural Sal forest: 2.0 ha). The laboratories are well equipped to carry out research of advanced and molecular nature. To facilitate grainage operations for carrying out Silkworm Breeding studies and Race Maintenance programme, two Tasar grainage buildings are available in the campus. Besides, three P4 Silkworm Breeding Stations located in Jharkhand and Chhattisgarh to undertake maintenance of the breeders' stock.

Project Monitoring, Evaluation & Coordination (PMEC) Section monitors and coordinates the entire R&D activities of the Institute and its nested Units.

Extension and Transfer of Technology (ETT) Section of the Institute coordinates the activities of nested Units in the methodical transfer of proven technologies developed / findings emanated from the above laboratories/sections for translating the



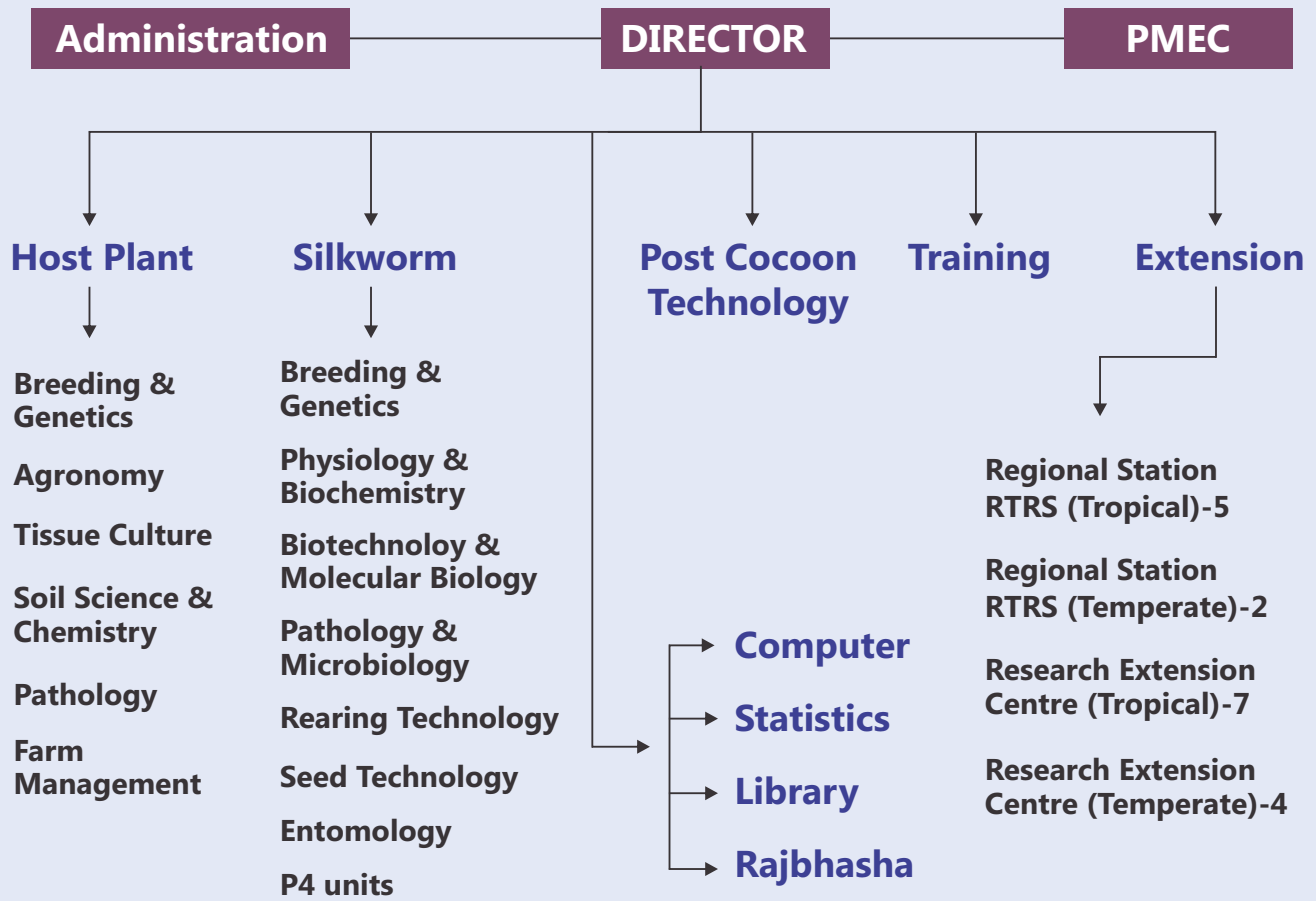
benefits of the same to the tasar farmers and other stakeholders. The extension network of Institute i.e., Regional Tasar Research Stations (RTRS, Tropical-5 & Temperate-2) and Research Extension Centres (REC, Tropical-7 & Temperate-4) situated in different tasar growing States extends the support in the transfer of technology.

Training Section of the Institute shoulders the responsibility of generating skilled and trained human resource in the field of tasar sector through various training programmes structured for different target groups from Department / Directorate of Sericulture of command States, stakeholders and entrepreneurs. It provides Star level hostel facilities for students/trainees. The Institute houses a well-equipped Library with all facilities and provides its readers the facilities like reference, inter-library loan, photocopying, etc. It has a good collection of over 3640 reference books/ text books on different aspects, bound volumes of scientific journals and a number of scientific magazines / newsletters.



Organisational Set up

CRT&TI, RANCHI



Take it to farmers!

In the decades to come, CRT&TI, Ranchi aims to anchor Vanya Silk Production improvement and natural resource management as the major drivers of change with strategies to breaking the yield barriers with the help of efficient and sustainable use of available natural and input resources for farmers of the country to adopt. The Institute will focus on developing technologies of 'direct use by farmer' for climate-smart agriculture; improved disease & pest-diagnostics and management; liquid and solid waste utilization besides policy research. The Institute will lay greater emphasis on taking the technologies to the end users in shortest possible time through innovative approaches and partnerships, involving information and communication technology.



Research & Technological Development

The Institute continued its earnest efforts for developing state-of-the-art technologies and generation of basic information through implementation of research projects/programmes on various aspects of tasar culture based upon the field requirement and need of the tasar industry. Presently, the Institute is implementing a number of research projects/programmes, including the projects with extramural funding from Department of Biotechnology (DBT) and Ministry of New & Renewable Energy (MNRE), Govt. of India. The institute has collaboration with University of Hyderabad, Birla Institute of Technology, Ranchi; National Institute for Animal Biotechnology, Hyderabad, Ranchi University, Ranchi and Vinoba Bhave University, Hazaribag.

Technologies / Products developed & patented / commercialized by Institute

To cater the need of tropical and temperate tasar culture, the Institute has developed a number of technologies/practices on pre- and post-cocoon sectors. Many of these technologies are being adopted in field for the production of quality silkworm seeds, cocoons and raw silk yarn, resulting in augmentation of the income of stakeholders. The Institute has also developed a number of products / implements / machines which are adopted as the components of technology packages for enhancement of productivity in pre- and post-cocoon sectors.





Technologies for Tropical Tasar

Technologies for Host Plants

1. Nursery technique for raising *Terminalia arjuna* and *T. tomentosa* seedlings.
2. Vegetative propagation through air layering, soft cuttings and juvenile cuttings.
3. Integrated package for raising and maintenance of host plants as Economic Plantation.
4. Establishment of Chawki garden for two crop system.
5. Application of secondary nutrient combination - SM5 for boosting the leaf yield.
6. Foliar application of Urea as economical method of boosting leaf production in *Terminalia* plants.
7. Integrated nutrient management through organic manures, chemical fertilizers, green manuring, micro- and secondary nutrients.
8. Integrated farming system for augmenting the farmers' income.
9. Integrated management of diseases and pests in *Terminalia* plants.
10. Utilization of farm refuses through composting and vermi composting.



Technologies for Tasar Silkworm Culture

1. Commercialization of three wild Tasar Ecoraces (Daba TV, Daba BV & Sukinda).
2. Development of inter-specific silkworm hybrid and breeds.
3. Commercialization of BDR-10 : An authorized race of tasar silkworm.
4. Model for *in-situ* conservation of tasar silkworm ecoraces.
5. Preservation of cocoons for tasar silkworm seed production.
6. Outdoor preservation of cocoons in moderate climate for synchronized emergence in the shorter span with lower disease incidence.
7. Nylon-net for enhancing coupling efficiency in tasar silkworm.
8. Development of egg laying devices.
9. Moth mating and oviposition for higher production of tasar silkworm seeds.
10. Mother moth examination for production of disease free seed of tasar silkworm.
11. Technology for loose egg production.
12. '*Depuratex*' for cleaning and surface sterilization of tasar silkworm eggs.
13. Integrated silkworm seed production technology.
14. Module for disinfection and hygiene in rearing field.
15. Egg incubation and larval brushing technique.
16. Package for young-age (Chawki) silkworm rearing.
17. Chawki rearing of tasar silkworm under nylon net.
18. Chawki rearing of tasar silkworm on Semi-synthetic diet – '*Tasar Amrit*'.
19. Integrated package of late-age silkworm rearing.
20. Indoor silkworm rearing technology.
21. Sodium hypochlorite as foliar application to check virosis and bacteriosis.
22. '*Tasar Keet Oushad*' against silkworm diseases.
23. '*Leaf Surface Microbe (LSM)*' for silkworm disease management.
24. Silkworm disease management using '*Jeevan Sudha*' formulation.
25. IPM against insect pest - Uzifly.
26. Management of silkworm pests and predators.

Sericulture - A tool for Self Employment and Poverty Alleviation

Technologies for Post-Cocoon Sector

1. Cocoon cooking recipes for softening of tasar cocoons for yarn production.
2. Non-peroxide cooking method for tasar cocoons.
3. Use of Cocoonase enzyme for softening of tasar cocoons.
4. Dry and Wet reeling processes.
5. Machines for reeling and spinning of tasar silk yarn.
6. Improved Reeling Charkha and Reeling Machines.
7. Pedal-cum-Motorised Tasar Reeling-cum-Twisting Machine for reeling of pierced tasar cocoons.
8. Twin Charkha.
9. Hand operated Wet Reeling Machine
10. 'Kamdhenu' - Improved Vertical Reeling-cum-Spinning Machine.
11. Motorized Tasar Reeling Machine / Charkha
12. Vegetable and Lac based dyeing of tasar fabrics.
13. Reeling of core spun and fancy yarn to reduce cost.
14. Waste reeling - Use of peduncles for yarn production.



Technologies for Temperate (Oak) Tasar

1. Raising of host plant seedlings and maintenance of plantation.
2. Commercialization of Oak tasar silkworm, *Antheraea proylei*.
3. Development of inter-specific silkworm hybrid and breeds.
4. Commercialization of RTRS-1 : A cross breed of Oak tasar silkworm
5. Commercialization of C27 : A cross breed of Oak tasar silkworm
6. Voltinism regulation through thermo-photo periodic and altitudinal deviations.
7. Indoor Chawki rearing technique.
8. Outdoor rearing technique for late age silkworm.
9. Silkworm disease management.
10. Crop regulation by development of rearing schedules for different altitudes.
11. Technology for maintenance of cocoon quality and fecundity.

Products developed by CTR&TI, Ranchi

1. Nylon bag for oviposition and brushing of worms.
2. Egg transportation basket.
3. Egg drying tray.
4. Flame gun device for disinfection of field and grainage.
5. Semi-synthetic diet – '*Tasar Amrit*' for young age silkworm rearing.
6. Nylon Net for silkworm rearing and pest control.
7. Cocoonase enzyme isolated from pupa for cooking/softening of cocoons.
8. '*Resham Keet Oushadh*' for silkworm disease management.
9. '*LSM*' for prevention of tasar silkworm diseases.
10. '*Jeevan Sudha*'- Botanical formulation for tasar silkworm protection from Virosis.
11. New Drug formulation for the control of Pebrine.
12. Pedal-cum-Motorised Tasar Reeling- cum- Twisting Machine for reeling of pierced tasar ocoons.
13. Twin Charkha.
14. Hand operated Wet Reeling Machine
15. '*Kamdhenu*'- Improved Vertical Reeling cum-Spinning Machine
16. Motorized Tasar Reeling Machine



Products & Technologies patented and commercialized

1. A Tent – Tasar Chawki Nylon Net
2. A Drug Formulation for the control of Pebrine Disease in Tasar Silkworm
3. '*Jeevan Sudha*' – A process for the preparation of *Jeevan Sudha* for the control of Virosis in Tasar Silkworm, *Antheraea mylitta* Drury
4. '*Depuratex*' - A product and process for cleaning and surface sterilization of tasar silkworm, *Antheraea mylitta* Drury eggs.

Under process of Patenting & Commercialization

1. Grainage tray (Reg. # PAT/4.3.20.1/98100)
2. Nursery technique for raising *Terminalia arjuna* seedlings (Reg. # PAT/4.3.40.1/98103)
3. Application of lac dye on tasar silk textiles (Reg. # IPR/4.3.1/08027)
4. 'Jeevan Dhara' for Indian tasar silkworm protection (Reg. # IPR/4.3.1/08028)
5. 'Jeevan suraksha' for prevention of diseases in tasar silkworm, *Antheraea mylitta* D. (Reg. # IPR/4.3.10.1/08029)
6. Tasar egg carrying and incubation device (Reg. # IPR/4.3.20/08030)
7. Cooling incubator for tasar silkworm eggs (Reg. # IPR/4.21.3/08056)
8. 'Tasar Amrit' : An ideal feed for Tasar silkworm, *Antheraea mylitta* Drury; filed as "A Feed for Silkworm" (Reg. # IPR/FA/11059-L/2011)
9. Novel technique for collection of bioactive enzyme cocoonase of *Antheraea mylitta* (Reg. # IPR/FA/11083-L/2011)
10. Motorized Reeling Charkha for reeling of tasar charkha cocoons (Reg. # IPR/FA/13037/2013)
11. 'Kamdhenu' - A Reeling-cum-spinning Machine for tasar silk yarn production [Reg. # IPR/FA/13036/2013]
12. Motorized reeling Charkha for tasar silk cocoon [Reg. # IPR/FA/13037/2013]



CTR&TI

CENTRAL TASAR RESEARCH & TRAINING INSTITUTE

A Nodal Institute for all R&D aspects of Tasar Culture

With Sole Objective of

**Improvement of Productivity, Excellence, Skill, Employment
Generation and Entrepreneurship for Strengthening
the Tasar Silk Industry as a whole**



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