

Micropropagation Enhances Sugarcane Productivity through Disease-free Planting Material

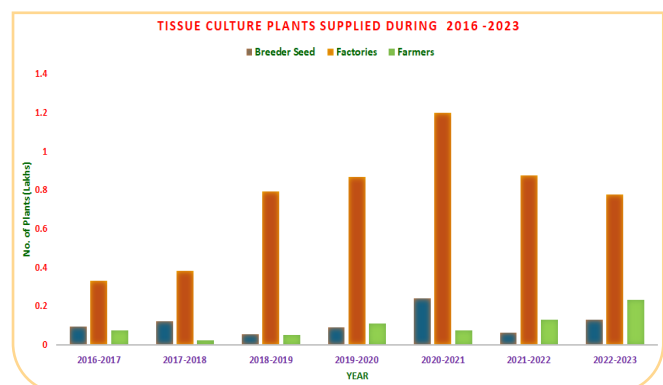
Micropropagation, an advanced tissue culture technique for producing high-quality planting material, has emerged as a successful strategy for improving sugarcane productivity and sustaining varietal performance. At the ICAR–Sugarcane Breeding Institute (ICAR-SBI), Coimbatore, scientists standardized and refined a meristem culture protocol to produce disease-free sugarcane seedlings, strengthening healthy seed nursery programmes across sugarcane-growing regions of the country. A widely cultivated “wonder” sugarcane variety released in 2000 gained popularity in tropical India and occupied extensive acreage by 2012. However, the repeated use of conventional seed material over the years resulted in varietal degeneration due to Yellow Leaf Disease (YLD) caused by Sugarcane yellow leaf virus. This led to a significant yield decline of nearly 30–40%, affecting both farmers and sugar mills.



Healthy crop raised by a farmer from tissue-culture seedlings

To address this challenge, ICAR-SBI promoted virus-free nurseries raised from meristem culture-derived tissue culture seedlings. The large-scale adoption of these healthy planting materials by sugar factories and farmers successfully reduced disease incidence and restored to high crop productivity. Between 2018–19 and 2022–23, tissue culture plants

produced at ICAR-SBI were supplied for Breeder Seed Production, sugar factory nurseries, and farmer-level cultivation, contributing to the rejuvenation of seed quality and improved cane yield. This initiative highlights the vital role of biotechnology-based seed systems in sustaining sugarcane production and ensuring long-term varietal health.



Tissue Culture Plants supplied during 2016-23

Impact of Micropropagation Technology

At present, tissue culture plants form the basic planting material in the seed production chain of all sugar mills and farmers in Tamil Nadu. Tissue culture seed nurseries are established, managed, and regularly monitored by the cane development staff of respective sugar mills. From these nurseries, high-quality single budded settlings are raised and supplied to farmers at an affordable cost. Notably, progressive farmers in the state have achieved cane yields ranging from 60

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- **Tropical and Subtropical Sugarcane Varieties micropropagated:** Co 86032, Co 11015, Co 14012, Co 18009, Co 0238, Co 0118, Co 0212, Co 09004, Co 06022, Co 06030, Co 15023.
- **Total Tissue culture Plants Supplied:** 5.90 lakhs
- **Area Covered:** 43 hectares
- **Beneficiaries:** 30 sugar mills from Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu, Gujarat, Telangana, Odisha, Uttarakhand, Uttar Pradesh
- **Income generated from Tissue culture plants and mother culture flasks:** Rs 55.85 lakhs

to 70 tonnes per acre with advanced agronomic practices by using seed cane raised from tissue culture-derived seed nurseries. This approach ensures varietal purity, disease-free planting material, and contributes to productivity enhancement of 15% or more.



Healthy Tissue culture crop with uniform growth and green canopy in Ponni Sugars, Erode

Training and technical support to tissue culture laboratories

ICAR-SBI had trained 22 staff from 14 public and private tissue culture laboratories from 2014 onwards, located in Andhra Pradesh, Haryana, Karnataka, Maharashtra, Tamil Nadu, Telangana, and Uttar Pradesh under the programme “Meristem Tip Culture for Production of Virus-Free Tissue Culture Plants in Sugarcane.

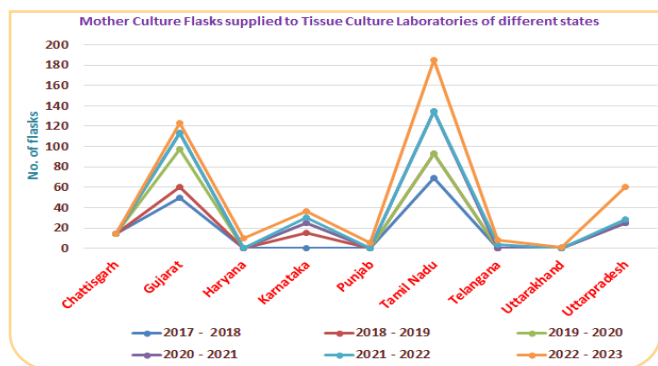
Impact on farmers' livelihood and agricultural practices

Between 2016 and 2023, farmers from Andhra Pradesh, Madhya Pradesh, Maharashtra, Karnataka, and Tamil Nadu benefited from tissue culture plants. In Maharashtra specifically from major districts of Kolhapur, Pune, Sangli, Satara, Lathur etc., the farmers have their own sugarcane nursery and benefit greatly by producing and selling quality single-budded settlings.

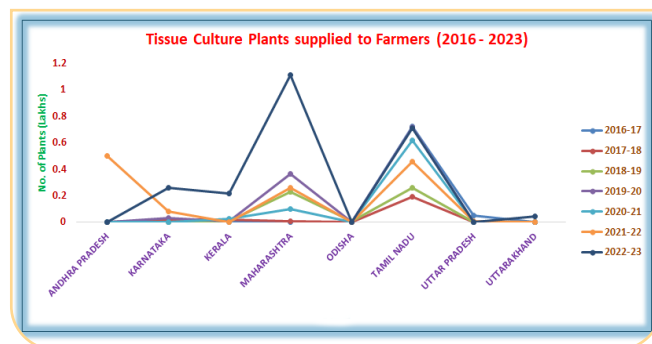
Case of a Maharashtra farmer: A progressive farmer from Maharashtra had adopted modern sugarcane seed production technology by starting with 500 tissue culture sugarcane plants in 10 cents area sourced from ICAR-Sugarcane Breeding Institute. He harvested the crop at 9 months and raised single budded settlings under shade net condition with more than 90% germination. This approach resulted in the production of 27500 healthy single budded settlings to establish a secondary nursery over 5 acres. In the next 9 months the secondary nursery yielded over 1.10 lakh single budded settlings. These were sold at a rate of Rs 2.30 each generating a gross income Rs 2.53 lakhs. Within a period of 18 months the farmer had earned a net profit of 2.00 lakhs by adopting tissue culture-based seed production system.

Benefits of Mother Culture based Tissue Culture Production Systems

In addition, to facilitate faster and easier multiplication and rooting, virus-indexed mother culture flasks at the S2 multiplication stage were supplied to private tissue culture laboratories. ICAR-SBI provided 284 flasks of genetically pure and virus-free cultures to tissue culture laboratories involved in sugarcane tissue culture plant production across the country viz., Chhattisgarh, Gujarat, Karnataka, Maharashtra, Punjab, Tamil Nadu, Telangana, Uttarakhand, and Uttar Pradesh.



Supply of Mother culture flasks by ICAR-SBI



Tissue Culture plants supplied to sugarcane farmers

Notably, several farmers in the state have achieved cane yields ranging from 60 to 70 tonnes per acre by using seed cane raised from tissue culture-derived seed nurseries compared to 40-45 tons /acre by the conventional method. An additional advantage of this technology is the rapid expansion of seed coverage; one acre of tissue culture –derived seed crop can cover 20-25 acres, compared to only 8–10 acres under the conventional sett propagation method.

Micropropagation has transformed sugarcane seed systems by replacing degenerated, disease-prone planting material with clean, high-quality seedlings, thereby improving farmers productivity, profitability, and sustainability.

D. Neelamathi, C. Jayabose, R. Valarmathi, Bakshi Ram, G. Hemaprabha and Raffee Viola
ICAR- Sugarcane Breeding Institute, Coimbatore-7

Outreach

Capacity building programmes for farmers and Cane Development Personnel

Training on 'Sugarcane farming for prosperity' (TSFP) for Tribal Sugarcane Farmers:

Institute organized a Training Programme on 'Sugarcane farming for prosperity' for the tribal farmers of Karumanthurai in Salem district as part of the 'Development Action Plan for Scheduled Tribe Component (DAPSTC)' project, in the Institute premises at Coimbatore. A Farmer-Scientist interaction for the 'Farm School on All India Radio' (FSA) participants from all over the state, was also arranged on the same day. Shri M. G. Ganesan, Project Director, Project Nilgiri Tahr, Govt. of Tamil Nadu delivered the Inaugural address. Recalling the outreach efforts of ICAR- Sugarcane Breeding Institute in Anamalai Tiger Reserve among the indigenous tribes, he appreciated the fact that the Institute had finalized the action plan and interventions, in consultation with the forest department with an eye on not disturbing the ecological and environmental balance of the region. This pattern of intervention among the indigenous communities by ICAR- SBI could serve as a viable model for replication by other agencies, he added.

In his Presidential address, Dr. P. Govindaraj, Director of ICAR- Sugarcane Breeding Institute highlighted the remarkable success of the Farm School on 'Sugarcane Farming for Prosperity' conducted by the Institute in collaboration with All India Radio, Coimbatore. The fact that several radio listeners among the sugarcane farmers from faraway places of Tamil Nadu are participating in the Farmer-Scientist Interaction itself bears testimony that radio still has significant relevance in this Android era, he said. Dr. D. Puthira Prathap, Principal Scientist and Nodal Officer of DAPSTC Project and Farm School on AIR, in his Introductory remarks mentioned that so far, over 1250 tribal households belonging to six indigenous tribes viz., Malasar, Malamalasar, Oorali, Malayali, Kurumbar and Irular spread across four districts of Tamil Nadu and Kerala had been benefitted by the DAPSTC project implemented by the Institute.



Distribution of Power tillers to Tribal sugarcane farmers



Farmer-Scientist Interaction

Besides the training sessions and farmer-scientist interaction, the farmers were taken to sugarcane fields of popular sugarcane varieties. They also witnessed machinery and visited the Sugarcane-based integrated farming system demonstration unit. Power tillers and battery-operated sprayers were distributed to two tribal settlements viz.,

Molayanoor and Vilampatti of Salem district. A DAPSTC video on 'Empowering tribals: Transforming Lives' was also screened during the occasion. Registered sugarcane growers of Subramaniya Siva Co-op Sugar Mills Ltd., Dharmapuri and Bannari amman Sugars Ltd., Erode had participated in the programme.

During the occasion, a Tamil publication entitled 'Sugarcane Farming for Prosperity' - வளமான வாழ்விற்கு கரும்பு சாகுபடி - was released and distributed.

- Institute organized a training programme on 'Advances in Sugarcane Production (TASP-25)' for the executive trainees of Dalmia Bharat Sugar and Industries Ltd. during 29-31 July 2025. The training included lectures, on-campus & off-campus field visits, and demonstrations.



TASP-25

- A one-day training was organised on 'Sugarcane production' for the sugarcane farmers of Cheyyar block, Tamil Nadu (ATMA) on 19 August 2025.
- Two Five-day Trainings on "Recent technologies for increased productivity in sugarcane" were organized for cane officials from Co-operative and Public sugar Mills of Tamil Nadu in two batches at the Institute under RKVY scheme during 8-12 & 22-26, September 2025.
- Institute organized a five-day training programme on 'Sugarcane Varieties and Technologies' (TSVT-25) during 15-19 September 2025 for the officials of Sugarcane Industries Department, Govt of Bihar.
- ICAR-SBIRC, Kannur, organised a one-day training on powder jaggery making to Papuan Global Pvt Ltd on 17th September 2025

Director's interaction with the tribals of ATR

- To strengthen the Development Action Plan for Scheduled Tribe Component (DAPSTC), project, aimed

at improving the quality of life of scheduled tribes through human resource development and basic amenities, Dr. P. Govindaraj, Director, along with DAPSTC team, visited tribal hamlets in the Anamalai Tiger Reserve (ATR) on 5 August 2025. Tribal settlements including Manjampatti, Attumalai, Porupparu, Poochikottamparai, Karumutti, Karattupathy and Thippipparai were identified for focused interventions. Following need assessments, the team interacted with tribal leaders and families in Attumalai, Porupparu and Thippipparai to explore livelihood opportunities, training, and distribution of seeds, farm tools, and essential items. The director also engaged with tribal women and children of Thippipparai, while honoring the sacrifices of freedom fighters and celebrating the 79th Independence Day across the settlements.



Director's interaction with the tribals of ATR

Trainings and Exposure Visits conducted at ICAR-SBI

- During the period, the Extension section of ICAR-SBI had organized two one-day training programmes with 48 trainees, 37 exposure visits benefitting 1540 students/academicians and 17 personalized advisories benefitting 45 sugarcane farmers.



Students from Agricultural College (TNAU), Killikulam at ICAR-SBI museum

Participation in Exhibitions



ICAR - SBI participated in Agri-Intex 2025 (International Agricultural Exhibition) by way of putting up a stall at CODISSIA Trade Fair Complex in Coimbatore during 10-14 July 2025.



Visitors at ICAR-SBI stall in Agri-Intex 2025

Academics

Six students completed the 15/21/30 -day exposure training (Internship) and three (3) students joined for 3-month project work at ICAR-SBI during July – September 2025

International Exposure



Dr.C.Appunu, has been deputed for a short term overseas training in Genome editing on “Advancing in planta transformation and precise genome editing technologies in crops” for six months from 17 September 2025 to 04 March 2025 in the Molecular Crop Improvement Lab, IGCAS, Texas Tech University, USA under ICAR EFC Project “Enhancing climate resilience and ensuring food security with genome editing tool” (1st Batch, 2024-25), sub-scheme “Basic and strategic research and education” of the scheme 'Crop science for food and nutritional security'.

Events Organized by/at the Institute



Independence day celebrations at the Institute on 15.8.25



ICAR-SBI collaborated with ICAR-CICR in conducting a meeting on 'Stakeholders consultation on increasing cotton production' chaired by Hon'ble Union Minister of Agriculture and Farmers Welfare at ICAR-Sugarcane Breeding Institute on 11th July 2025.



'Stakeholders consultation on increasing cotton production'; 11.7.26



The Institute's Research Advisory Committee (RAC) Meeting was held during 28 – 31, July 2025.



RAC meeting in progress



ICAR-SBI organised “Paddy Transplanting Event” in the Additional Land Farm and ECC farm of the Institute on 20 August 2025 and 18 September 2025, respectively.



A review meeting was organised for ICAR-SBI-ISMA to assess the progress of the project on 26 August 2025 wherein delegates from sugar factories participated in the meeting.



ICAR-SBI-ISMA Review meeting

- Institute Research Committee Meeting was held at the Institute during 22-26, September 2025
- Hindi Day was celebrated at the Institute on 30 September 2025 during which a series of competitions including Hindi Dictation, Hindi Handwriting, Hindi Essay writing, singing competition etc., were conducted for the staff of the Institute.



Secretary, Sugarcane Industries Department, Govt. of Bihar visiting labs at ICAR-SBI

- A meeting was held at the Institute with Shri.B.Kartikey Dhanji, IAS, Secretary, Sugarcane Industries Dept, Govt. of Bihar, and his team on 07 July 2025, for

possible collaborative initiatives between ICAR-SBI and the Government of Bihar.

Awards and Recognitions

- Scientists of ICAR-SBI, **Dr. K. Hari (Team Leader), Dr. D. Puthira Prathap, Dr. P. Murali, Dr. A. Rameshsundar, and Dr. B. Singaravelu**—have been honored with the prestigious '**Rashtriya Krishi Vigyan Puraskar - 2025**' (**National Agricultural Science Award- 2025**), the highest national recognition honoring exceptional contributions in agricultural research, education, extension, and allied sciences, instituted by the Department of Agricultural Research and Education (DARE), Govt. of India, under the category 'Innovation & Technology in Agriculture & Allied Sciences'.

The award was presented by Hon'ble Union Agriculture Minister Shri Shivraj Singh Chauhan on 16 July 2025, during the 97th Foundation Day of the Indian Council of Agricultural Research (ICAR), in the august presence of Hon'ble Union Minister of State, Shri Bhagirath Chaudhary, senior officials and farmers.



ICAR-SBI scientist-team receiving the prestigious Rashtriya Krishi Vigyan Puraskar - 2025

- D Puthira Prathap received the MASU Award of Excellence - 2025 (Social Sciences) during MASU's (Madras Agricultural Students' Union, TNAU, Coimbatore)114th Foundation Day on 14 July 2025.

Media efforts

- A radio feature on the DAPSTC Training Programme on '**Sugarcane farming for prosperity**' for the tribal farmers of Salem district and the Farmer-Scientist interaction held on 9 July 2025 was broadcast through All India Radio, Coimbatore, on the following dates.

- 15.7.2025 - Oorpurathile.. (Dr D Puthira Prathap)
- 15.7.2025 - Erum oorum.. (Farmer-scientist interaction - I)
- 16.7.2025 - Oorpurathile.. (Shri M.G Ganesan IFS, Guest of honour)
- 16.7.2025 - Erum oorum (Farmer-scientist interaction-II)
- 05.08.2025 - Erum oorum (Dr P Govindaraj, Director)
- 06.08.2025 - Erum oorum (Dr. S Alarmelu and Dr P. Geetha)

- 07.08.2025 - *Erum oorum* (Dr N Geetha - I)
- 08.08.2025 - *Erum oorum* (Dr N Geetha - II)

Appointment/Promotion/ Transfer/Retirement

- Dr.T.Subramani, Senior Scientist (Agronomy) promoted to Principal Scientist w.e.f. 26.06.2023.
- Dr.C.Appunu, Senior Scientist (Genetics & Plant Breeding) w.e.f. 26.06.2023.
- Dr.K.Lakshmi, Senior Scientist (Agrl. Biotechnology) promoted to Principal Scientist w.e.f. 26.06.2023.
- Dr K.Thamilarasi, Senior Scientist (Agrl. Biotechnology) promoted to Principal Scientist w.e.f. 26.06.2023.
- Dr.R.Arun Kumar, Senior Scientist (Plant Physiology) promoted to Principal Scientist w.e.f. 26.06.2023.
- Dr.G.S.Suresha, Senior Scientist (Biochemistry (Plant Science)) promoted to Principal Scientist w.e.f. 10.02.2024.
- Dr.P.T.Prathima, Senior Scientist (Biotechnology (Agrl. Science)) promoted to Principal Scientist w.e.f. 10.02.2024.
- Dr.Mintu Ram Meena, Senior Scientist (Genetics & Plant Breeding), ICAR-SBI-Regional Centre, Karnal promoted to Principal Scientist w.e.f. 10.02.2024.
- Smt.S.K. Anumalaviga, LDC promoted to the post of Upper Division Clerk w.e.f. 17.09.2025.
- Shri Bijin S.J. appointed as Technician (T-1) w.e.f. 03.07.2025.
- Dr.Saneera E.K., Scientist (Entomology), ICAR-SBI-Research Centre, Kannur transferred to ICAR- Central Agricultural Research Institute-Research station, Minicoy, Lakshadweep on 26.09.2025.
- Smt.A.Kala, Senior Technician retired on Superannuation on 31.08.2025.
- Sh.M.Subramanian, Skilled Support Staff retired on Superannuation on 31.08.2025.

Handbook on Sugarcane Cultivation Published !



Copies of this 224-page handbook on sugarcane cultivation in Tamil (வளமான வாழ்விற்கு கரும்பு சாகுபடி) can be ordered from the Institute by payment of Rs.170.00 (incl. postal charges) to State Bank of India, Veerakeralam,; Account Name: 'ICAR UNIT - SBI' ; Account Number: 10663184080 ; IFSC No. of Bank: SBIN0010618. After payment, a confirmation email may please be sent to directorsbiicar@gmail.com with details. Chapter particulars are available at <https://sugarcane100.blogspot.com/>.

