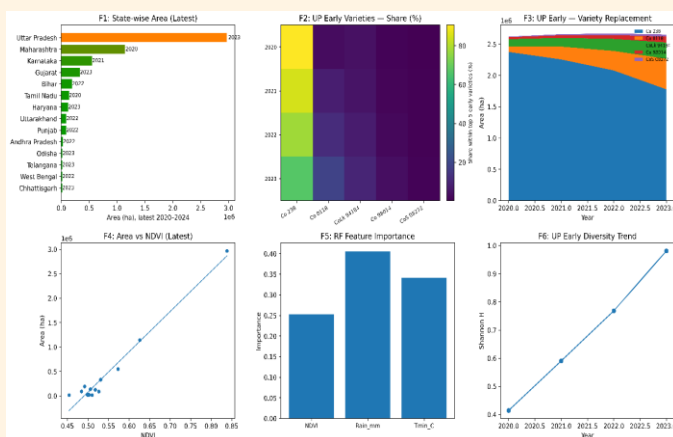


## From Fields to Forecasts: AI-Enabled Remote Sensing for India's Sugarcane sector

Artificial Intelligence (AI) and Remote Sensing (RS) are changing the way we understand sugarcane data. Earlier, sugarcane statistics were just old, fixed numbers in tables. Now, AI and RS turn them into a live, location-wise information system. Satellite-based vegetation indices (measures of crop greenness), e.g., Normalized Difference Vegetation Index (NDVI)/ Enhanced Vegetation Index (EVI), and Synthetic Aperture Radar (SAR) radar signals help detect crop area, crop health, ratoon vs. plant cane, and stress caused by drought, flooding or extreme weather. Machine-learning (a type of AI) combines these satellite observations with weather, soil, and farm management data to explain why changes in area or productivity happen. This combined approach improves timeliness (near-real-time area estimates), detail (field-to-district level mapping), and reliability (cross-validation of reported numbers).

### A case of AI-enabled Remote Sensing for India's sugarcane sector

A graphical representation of India's sugarcane sector using AI-enhanced remote sensing is presented in Figure.1.



**Figure. 1:** AI-enhanced remote sensing view of India's sugarcane (2020-2024): state-wise area ranking (F1), UP early-variety shares and replacement (F2, F3), satellite data validation through Area-NDVI relationship (F4), key factors affecting sugarcane identified by Random Forest (RF) importances; F5), and trend in varietal diversity (F6).

### State-wise area

In the figure, F1 ranks states by latest available area (2020-2024): Uttar Pradesh (UP) leads with the largest area (multi-million-hectare scale), while Gujarat shows a noticeable recent increase; Haryana has moderate area, and smaller states remain stable.

### Share of Early Varieties in Uttar Pradesh

Data in F2, (UP early-variety shares) reveal a clear shift: Co 0118 and CoLk 94184 are expanding, while Co 0238's leading position is declining – showing that farmers are adapting to current farming conditions and market needs.

### Replacement of Early varieties in Uttar Pradesh

Data in F3's stacked area chart make the variety replacement clearly visible within UP's early-maturing group: Co 0238's total area is shrinking, while Co 0118 is rising sharply, with CoLk 94184 growing steadily – this is very useful for seed planning and for mills to know the expected variety mix.

In the figure, F4 shows a positive area-NDVI (Normalized Difference Vegetation Index) relationship, confirming that remote sensing is a reliable and practical indicator for measuring crop area and crop health, and can serve as a quality check for reported statistics.

In the figure, F5's Random-Forest (RF) importances highlight that NDVI (crop greenness) and rainfall are the main factors driving sugarcane production (temperature plays a lesser role). This is consistent with the fact that sugarcane is highly sensitive to water availability. In practical terms, this helps decide what to monitor first and which data to use when making crop forecasts.

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- **AI-Enabled Remote Sensing for India's Sugarcane sector**
- **Orientation Workshop on VKSA (Viksit Krishi Sankalp Abhiyan)**
- **National Sugarcane Flower Induction Facility inaugurated**

In the figure, F6's rising Shannon diversity index (a measure of how many different varieties are grown) indicates lower risk from depending on a single variety — meaning better protection against pest, disease, or climate shocks. However, it also means more complex handling for mills during crushing. Taken together, these panels demonstrate a complete and reliable

process: Remote Sensing confirms and improves statistics; AI identifies the key factors and helps in future projections; and varietal analysis leads to practical actions including better area planning (zoning), input scheduling, and procurement strategies for a more profitable and climate-aware sugar sector.

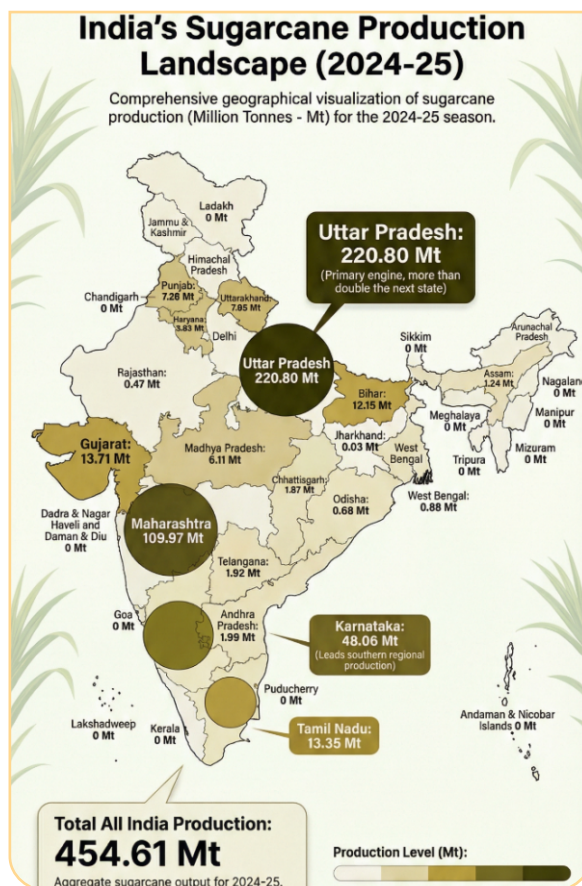


Figure. 2: India 2024-25: Leading Sugarcane Producers (million tonnes)

Further, the colour-shaded map (Figure. 2) shows India's sugarcane production by state in 2024, with darker shades of green indicating higher production. The total national production is 454.61 million tonnes (Mt). Production is highly concentrated: UP leads at 220.80 Mt, followed by Maharashtra (109.97 Mt) and Karnataka (48.06 Mt). Medium-level producers include Tamil Nadu (13.35 Mt), Gujarat (13.71 Mt), Bihar (12.15 Mt), Punjab (7.26 Mt), Madhya Pradesh (6.11 Mt), Haryana (5.83 Mt), and Odisha (0.68 Mt). Southern and western regions show strong production, while much of the east, northeast, and Himalayan states contribute very little or nothing. The legend shows the scale (0 to 220.80 Mt), and the data source is Department of Agriculture & Farmers Welfare (DA&FW). Overall, the map highlights a north-central to peninsular “sugarcane corridor,” which is useful for planning mill capacity, transport routes, and focused farming and climate-preparedness programmes.

### Benefits

- For planners and sugar mills, AI-Enabled Remote Sensing improves harvest planning, water and nutrient recommendations, and helps decide which varieties to grow in which areas.
- For scientists, it helps in testing research ideas — for example, studying how the adoption of new varieties is linked with unusual weather patterns, crop growth stages (phenology), and sustainability measures. It also helps in measuring how certain or uncertain our estimates are, which is important for making good policies.

Vinayaka and P Murali

ICAR- Sugarcane Breeding Institute, Coimbatore - 7

# Outreach

## Capacity building programmes

### ICAR-Sugarcane Breeding Institute organizes Orientation Workshop on VKSA (Viksit Krishi Sankalp Abhiyan)

The Indian Council of Agricultural Research (ICAR) in association with the Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India, is organizing a nation-wide campaign entitled, 'Viksit Krishi Sankalp Abhiyan' ("VKSA - Mission for Developed Agriculture") from 29th May to 12th June 2025 across all states and union territories of India. During the period, the scientists will connect directly with farmers at the grassroots level, particularly in rural, bordered and underserved regions and prepare them for the Kharif cropping season.

In this connection, ICAR-Sugarcane Breeding Institute, Coimbatore organized an Orientation Workshop on VKSA for those scientists who are being deputed for the campaign in the Institute premises on 27th May 2025.

Inaugurating the Workshop, Dr. P. Govindaraj, Director of ICAR-Sugarcane Breeding Institute said that the campaign will be implemented by 113 ICAR research institutes, 731 Krishi Vigyan Kendras (KVKs), agricultural Universities and the State Departments of Agriculture, Horticulture, Animal Husbandry, and Fisheries across the country. He called upon the scientists to hold discussions with the farmers and make them aware of the major crops suitable for the Kharif season in their specific agro-climatic regions and the improved agronomic practices they can adopt. Under the theme 'Lab-to-land', the campaign focuses on empowering every Indian farmer with cutting-edge innovations, scientific farming practices, and timely support systems. Besides creating awareness of farm technologies, they should also sensitize them about government schemes and policies on agricultural development, he added.

Smt. D Punitha, Deputy Director of Agriculture (Government of India Schemes), Coimbatore district in her presentation listed out the various Central and State Government schemes such as *Paramapagarat Krishi Vikas Yojana* (PKVY), National Food Security & Nutrition Mission (NFSNM) schemes – pulses, nutriceals, Soil Health Card, Integrated Farming System, School Soil Health Card Programme, Pradhan Mantri Krishi Sinchayi Yojana & Tamil Nadu Millet Mission.

Smt. S.Ramya, Farm Sector Technical Officer, State Bank of India and Smt. Daisyrani Gogoi, Branch Manager, State Bank of India, Veerakeralam spoke on the schemes available for farmers in the nationalized banks for those farmers who wish to take up seed production, set up processing units, avail Kisan Credit Card scheme etc., Earlier, Dr. D. Puthira Prathap, Principal Scientist & Nodal Officer, VKSA, in his interaction,

outlined the objectives and modus operandi of VKSA campaign. He made a presentation on schemes available for sugarcane farmers being operated by the Department of Sugar and the State Agricultural Engineering Department such as Special incentive, subsidy for the purchase of seed material, assistance for wide-row planting, trash shredding & trash mulching and assistance for purchase of machinery / establishment of custom hiring centres. He also informed that 60 ICAR-SBI scientists are being deputed to 16 districts of Tamil Nadu and one district of Puducherry to interact with farmers on climate- resilient seed varieties, technologies, and the benefits of existing Central & State Government Schemes during the campaign.

During the interaction session, the presenters clarified the doubts raised by the scientists. Dr C. Palaniswami, Principal Scientist & Co-ordinator, VKSA proposed the vote of thanks towards the end (Detailed report at <https://krishijagran.com/news/icar-sugarcane-breeding-institute-organizes-orientation-workshop-for-viksit-krishi-sankalp-abhiyan-vksa/>).



Orientation Workshop on Viksit Krishi Sankalp Abhiyan

- ICAR-SBI organised a comprehensive Training Programme on Biological Data Analysis using R during 20-23, May 2025 at the Institute.



Participants of the Training Programme on Biological Data Analysis using R

### Trainings and Exposure Visits conducted at ICAR - SBI

During the period, the Extension section of ICAR-SBI had organized three one-day training programmes with 97 trainees, 19 exposure visits benefitting 872 students / academicians and 17 personalized advisories benefitting 40 sugarcane farmers.



Students at ICAR-SBI museum

### Frontline Demonstration (FLD)/Other Demonstrations



An FLD on Co 18009 sugarcane variety has been initiated in the field of Smt. D. Nivetha, Kanjappalli, Annur Taluk, Coimbatore district, who is a registered cane grower of Bannari amman sugars ltd.



An FLD on Co 14012 sugarcane variety has been initiated in the field of Smt Valli Sathish, a tribal farmer belonging to Melchootra village in Pudur, Attappady, Kerala, in association with ICAR-KVK, Palakkad, as part of DAPSTC (Development Action Plan for Scheduled Tribe Component) project



FLD on Co 18009 variety in Erode, TN



FLD on Co 14012 variety in Attappady hills



Six demonstrations were organised in batches on Micro nutrient spray using Drone (UAVs) in Sugarcane fields belonging to 257 farmers of Kallakurichi, Thiruvannamalai, Erode, Thiruchirappally and Ariyalur districts of Tamil Nadu during April, 2025.



Micro-nutrient spraying using UAV

### Participation in Exhibitions



Institute participated in the Regional Agricultural Exhibition and Seminar, organized by the Department of Agriculture and Farmers' Welfare, Government of Tamil Nadu, during June 11-12, 2025 at Perundurai, Erode district, by putting up a stall.



ICAR-SBI's exhibition stall at Perundurai



Institute participated in the launch of nation-wide campaign, "VKSA - Mission for Developed Agriculture" in Kallippatti village of Erode district in Tamil Nadu on 29.05.2025, by putting up a stall.



Director, ICAR-SBI, Dr R. Thamizh Vendan, Vice-Chancellor, TNAU & Dr A. Velmurugan, ADG, ICAR having a look at ICAR-SBI's varietal display during VKSA launch in Erode

## Academics

- During April-June 2025, twenty-five students completed the 15/21/30 days exposure training (Internship) and three students completed a three-month project work at ICAR-SBI. An orientation / debriefing session was organized for the incoming and outgoing students on 27.6.2025.



*Student interaction session held at the Institute on 27.6.25*

## Events Organized by/at the Institute

- An invited lecture on “Reviving sugar industry in Tamil Nadu – Challenges and Opportunities” by Dr. R.Viswanathan, Director, ICAR-ISRI was organised by NAAS Chapter, Coimbatore at ICAR-SBI on 15 April 2025 (hybrid mode).



*NAAS lecture on 'Reviving Sugar Industry in Tamil Nadu'*

- An interaction meeting of scientists with Sugarcane Industries Department, Govt. of Bihar officials was organized at ICAR-SBIRC, Karnal for a discussion on future prospects of SBIRC, Karnal technologies in Bihar on 16 April 2025
- ICAR-SBI celebrated the 7<sup>th</sup> Poshan Pakhwada 2025 by organizing a series of events during 08-22 April 2025. On this occasion, Nutrition Awareness programmes were organised in three Anganwadis located at Pongaliyur, TG Nagar & Veerakeralam .



*Nutrition awareness programme for children*

- An 'Awareness cum Demonstration on Mechanization in hill agriculture' was conducted at Thoddanie village in the Nilgiris, under the Development Action Plan for Scheduled Caste (DAPSC) project by ICAR- Sugarcane Breeding Institute, Coimbatore on 25.4.2025. Altogether, 40 farmers from three villages, viz., Thoddanie, Periyarnagar, and Jeeva Nagar, participated in the event.



*Director, ICAR-SBI with farmers during the Mechanization campaign held at the Nilgiris*

- ICAR-SBI participated in the 'VKSA (Viksit Krishi Sankalp Abhiyan) campaign from 29th May 2025 to 12<sup>th</sup> June 2025 with 60 scientific Staff for dissemination of technologies and creating awareness on government schemes to the farming community. In total, 17 districts of Tamil Nadu and Pondicherry were covered in this campaign in coordination with concerned ICAR-KVKs of the districts.



**VKSA programme of ICAR-SBI**

- ICAR South Zone Sports Tournament 2024 was successfully conducted by ICAR-SBI during 8-11 April 2025, with over 970 athletes from 27 institutes across South India, including CIFE Mumbai, CCARI Goa, and IARI-New Delhi. The opening ceremony was held on 08.04.2025, and the closing ceremony took place on 11.04.2025. Various sports events were organized at Nehru Stadium, the TNAU campus, and ICAR-SBI in Coimbatore.



**Dr D K Yadava, DDG (CS), ICAR, New Delhi addressing the sports persons at the Closing Ceremony of ICAR-South Zone Sports Tournament-2024**

- The 11<sup>th</sup> International Yoga Day was celebrated from 18<sup>th</sup> June to 21<sup>st</sup> June 2025 with Video campaign on the Y-Break/Namaste Yoga App, Lectures on the basics of Yoga and the theme, "Yoga for One Earth, One Health", Yoga asanas & Quiz competitions. The celebrations concluded on 21.06.2025 with "Yoga Sangam" event.



**Yoga day celebrations**

- The General Body Meeting of the Staff Recreation Club was held on 20.06.2025 and the Staff Recreation Club was reconstituted with effect from 01.07.2025.
- The Dr.K V Srinivasan Sugarcane Disease Screening & Quarantine Complex was inaugurated at the Institute by Dr D K Yadava, DDG (CS), ICAR on 12.4.2025



**Inauguration of Dr.K V Srinivasan Sugarcane Disease Screening & Quarantine Complex**

**National Sugarcane Flower Induction Facility inaugurated!**

The National Sugarcane Flower Induction Facility at ICAR-SBI was inaugurated by Dr.D K Yadava, DDG (CS). ICAR on 12.4.2025. Intended for utilization by AICRP centers across the country, the facility is equipped with precise controls for temperature, humidity, and light—covering both quality and intensity. This setup will promote flowering in precious parent clones that do not flower under natural conditions in Coimbatore.



**National Sugarcane Flower Induction Facility at ICAR-SBI**



**DD Kisan team at ICAR-SBI**



**DD Kisan programme on Sugarcane**

**Awards and Recognitions**

- Dr.P.Malathi received **“Best Innovator Award”** organized by ICAR-National Institute of Research on Commercial Agriculture (ICAR-NIRCA) in the INNOVATORS MEET held on 8 April 2025.
- Dr.D.Puthira Prathap, was conferred with the 'Scientific Tamil Excellency Award' during the Tenth National Conference of Scientific Tamil held in TANUVAS , Chennai during 4-5 April 2025

**Media efforts**

With inputs from ICAR-Sugarcane Breeding Institute, Coimbatore, DD Kisan, New Delhi has produced a programme (in Hindi) entitled "गन्ने की उन्नत किस्म से किसानों को लाभ ही लाभ" Kisan Channel on May 15, 2025, at 7 pm – in its *Krishi Vishesh* segment – (290<sup>th</sup> episode). It is available on YouTube at : <https://www.youtube.com/watch?v=ancXVdxDQ4&list=PLPiiF2hRQqfrM5si90CotKuU2iWdyWjYs&index=10>

- News on ICAR-SBI's participation in VKSA appeared in *Dinamalar* daily <https://www.dinamalar.com/news/tamil-nadu-district-news-coimbatore/agricultural-scientists-workshop-in-coimbatore/3943320> and All India Radio's X page : [https://x.com/airnews\\_Chennai/status/1933040855117357496?t=xGOEDORcYFhnWsVSYtLQAO&s=08](https://x.com/airnews_Chennai/status/1933040855117357496?t=xGOEDORcYFhnWsVSYtLQAO&s=08)

**Hindu Tamil daily**  
10 June 2025

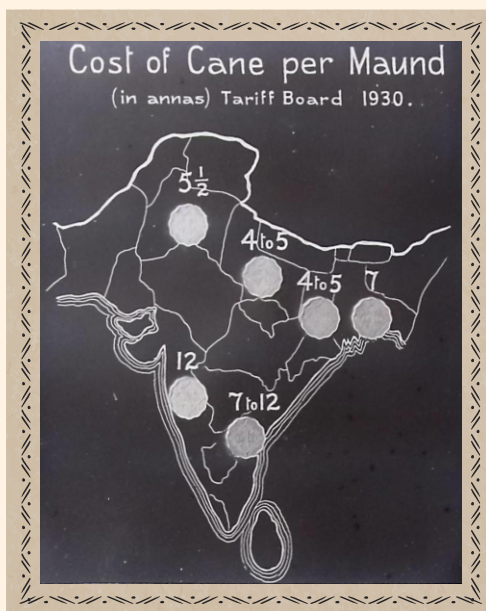
**News on Co 11015 variety ; Hindu Tamil Thisai Daily, 10.6.2025**

## Appointment / Transfer / Promotion / Retirement

- Dr.R.Gobu, Scientist (Plant Breeding) promoted to the revised Research Pay Level-11 w.e.f. 07.01.2024.
- Dr.K.Nithya, Senior Scientist (Plant Pathology) promoted to the revised Research Pay Level-13A w.e.f. 15.09.2023.
- Dr.P.Geetha, Senior Scientist (Agronomy) promoted to the revised Research Pay Level-13A w.e.f. 15.12.2023.
- Dr.Pooja, Senior Scientist (Plant Physiology), ICAR-SBI-RC, Karnal promoted to the revised Research Pay Level-13A w.e.f. 17.04.2024.
- Dr.M.Alagupalamuthirsolai, Senior Scientist (Plant Physiology) promoted to the revised Research Pay Level-13A w.e.f. 03.05.2024.
- Dr.K.Elayaraja, Senior Scientist (Plant Breeding) promoted to the revised Research Pay Level-13A w.e.f. 16.07.2024.
- Smt.V.Asha Kumari, AAO promoted to the post of Administrative Officer w.e.f. 25.04.2025.
- Smt.J.Emily Florence Daisy Rani, Assistant, promoted to the post of Assistant Administrative Officer w.e.f. 30.05.2025.
- Smt.R.Mahalakshmi, LDC granted 1st MACP w.e.f. 15.05.2025.
- Dr.K. Gopalareddy, Scientist (Plant Breeding) transferred to the ICAR-Indian Institute of Seed Science, Mau, Regional Station, Bengaluru on 16.04.2025 upon appointment to the post of Senior Scientist.
- Sh.Devassy P.V., Senior Administrative Officer retired on Superannuation on 31.05.2025.
- Sh.S.Shanmugam, SSS retired on Superannuation on 30.04.2025.

## Cost of Sugarcane 95 years ago!

## Heritage CORNER



Cane Cost Estimate by the Tariff Board in 1930.

(N.B. Maund = approximately 37.32 kg; Value of one anna = 1/16<sup>th</sup> of a rupee)

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