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ICAR - SBI NEWS

ICAR- Sugarcane Breeding Institute, Coimbatore - 641 007.

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Strengthening Sugarcane Seed Supply Chain via Farmers' Participatory Quality Seed Production

Quality seed is the foundation for successful crop production. The ICAR – Sugarcane Breeding Institute (ICAR–SBI), Coimbatore, has been a reliable source of genetically pure and virus-free sugarcane seed material for farmers. With the increasing demand for high-quality seed canes, the institute launched the Farmers' Participatory Seed Production Programme in 2016 – 2017 to enhance seed availability and ensure sustainability in sugarcane cultivation.

A Three-phase Seed Production System

The programme operates under the direct supervision of ICAR–SBI scientists and follows a structured three-phase approach:

1. Tissue Culture Propagation:

High-quality planting material is developed through apical meristem culture using the nucleus materials from the institute's maintenance breeding plots. These tissue culture plants are tested for genetic fidelity and indexed for viruses to ensure disease-free, true-to-type material.

2. Breeder Seed Production:

The virus-free tissue culture seedlings are then planted at the institute's research farm to produce breeder seed canes. A team of experts oversees the crop to maintain quality and genetic purity.

3. Quality Seed Production at Farmers' field:

The breeder seeds are distributed to selected progressive farmers for carrying out seed production. These fields are routinely monitored by the seed team. Once the crop reaches 7–8 months, the canes are manually harvested and supplied to sugar factories based on their indent. Sugar factories use this material as the basic seed material for their seed nursery programme. They follow a three-tier nursery system to multiply this material further before distribution to commercial growers.

Impact

Over the past eight years, several high yielding varieties of the institute including **Co 86032, Co 06030, Co 0212, Co 06022, Co 0403, Co 09004, Co 11015, Co 14012,** and **Co 18009** have been successfully multiplied and distributed across Tamil Nadu, Karnataka, and Andhra Pradesh.

Programme Achievements

- **Total Quality Seed Cane Supplied:** 10450.485 tons
- **Gross Revenue Earned by Farmers:** ₹ 3.20 crores
- **Varieties Currently in Seed Production:** Co 86032, Co 11015, Co 14012, Co 18009

Benefits and Economic Viability

The participatory seed production model offers multiple advantages to seed production farmers:

- **Premium Procurement Rate:** ₹3,500 per ton
- **Reduced Labour Costs:** No detrashing or harvesting charges
- **Short Crop Cycle:** 7 - 8 months
- **Buyback Assurance and Immediate Payment**
- **High Productivity in a short time:** on an average 40 – 45 tons/acre in 7 - 8 months.

The use of high-quality breeder seed, coupled with farmer expertise and institutional support, has consistently resulted in high yields and substantial income. The impressive financial returns have motivated seed farmers to remain active participants in the programme, reaffirming its continued success.

CONTENTS

- *The success story of 'Farmers Participatory Seed Production' at ICAR-SBI*
- *22nd Sugarcane R&D Workshop of Southern Karnataka*
- *Iniya Powdered Jaggery – A Product of ICAR-SBI*

Looking Ahead

The growing demand for quality seed cane underscores the need for scalable, science-driven interventions. The ICAR–SBI's participatory seed production programme not only meets this demand but also empowers seed farmers with better income opportunities and access to good quality planting material. As the institute moves forward, it remains committed to ensuring seed quality, expanding outreach, and strengthening farmer partnerships to enhance the productivity and sustainability of India's sugarcane sector.

An interaction with the sugarcane seed farmers can be found at https://youtu.be/rKRpZAuNiMA?si=bAlLu1J3prndM6vc

Supply of single-bud settlings to farmers

Field view of seed crop at harvest

R. Gobu, A.J. Prabakaran, S. Karthigeyan, A. Anna Durai, K. Mohanraj, D. Neelamathi, C. Jayabose, R. Valarmathi, R. Selvakumar, B. Singaravelu and N. Rajendra Prasad,
ICAR-Sugarcane Breeding Institute, Coimbatore – 641007.

22nd Sugarcane R&D Workshop of Southern Karnataka

ICAR- Sugarcane Breeding Institute had organized the 22nd Sugarcane Research & Development Workshop of Southern Karnataka at B.N.Bahadur Institute of Management Sciences, Manasagangothri, University of Mysore, Mysuru, during 20-21 June 2024 and discussed the following topics.

i. Review of action taken on the recommendations of the previous workshop
ii. Managing drought & measures to improve irrigation water use efficiency
iii. Interventions for improving sugarcane yields in Southern Karnataka
iv. Review of mechanization initiatives in the region including mechanical harvesting
v. Varietal position in sugar factories, Performance of new sugarcane varieties & AICRP (S) Varietal trials
vi. Sugarcane seed nursery programme

Besides discussion on these topics, an open- interactive session and a Special lecture on 'Why should sugarcane farming be the preferred choice of farmers of Southern Karnataka?' was delivered during the workshop.

Coromandel Sugars Ltd.., Makavalli and M. Visvesvaraya Sugarcane Research Centre, Mandya of S.Nijalingappa Sugar Institute, Belagavi jointly hosted the workshop. About 250 delegates comprising scientists from ICAR-Sugarcane Breeding Institute, Coimbatore, UAS-Bangalore & S..Nijalingappa Sugar Institute, Cane Development personnel from various sugar factories, officers from the Department of Agriculture, and other Cane Development organizations in Karnataka had participated in the workshop.

Release of 'Compendium of Research Articles and Status Papers' at the Workshop

An interactive session in progress at the Workshop

Iniya Powdered Jaggery – A Product of ICAR-SBI

In recent years, increasing awareness about health and nutrition has boosted the demand for natural and safe food products. Jaggery, also known as non-centrifugal sugar, is one such traditional sweetener made from sugarcane juice. Unlike refined white sugar, jaggery retains essential nutrients such as amino acids, antioxidants, phenolics, and vital minerals like calcium, iron, phosphorus, magnesium, and potassium, making it a healthier substitute. Ancient Indian texts, including the Atharva Veda, mention the use of sugar, showing its deep cultural roots. Recognizing its nutritional value, ICAR–Sugarcane Breeding Institute (ICAR-SBI), Coimbatore, developed "Iniya" powdered jaggery using a modernized yet natural process.

For production, 12-month-old sugarcane is harvested, washed, and crushed to extract juice, which is clarified by adjusting pH and removing impurities. Coconut oil is added during boiling for flavour and consistency, and the jaggery is cooled and powdered. Importantly, no chemicals or preservatives are used, while bagasse serves as fuel for the process.

Nutrient composition of powdered jaggery

"Iniya" Powdered Jaggery, a Sugarcane product manufactured by ICAR- Sugarcane Breeding Institute, Coimbatore is rich in imperative minerals (calcium: 372 ppm, magnesium: 698 ppm, potassium: 7047 ppm, sodium:143 ppm, iron: 46 ppm, manganese: 4.0 ppm, zinc: 13.5 ppm, copper: 2.4 ppm, and), vitamins (vitamin A: 0.24 IU, vitamin C: 57.42 mg/100mg), moisture: 4.85 g/100g, Sucrose 76.80 g/100g, total sugar: 90.27 g/100g, extraneous matter: 0.19 g/100g, reducing sugar: 9.43 g/100g, Sulphated ash: 2.23 g/100g, 3792 cal/g of jaggery.

Comparative Nutritive Analysis of Brown and White Sugar

Nutritional Information (As per 100 gms)	Brown Sugar	White Sugar
Energy	379.2 Kcal	495.Kcal
Total Sugar	90.27 g	98.0g
Fat	0.18 %	0.12 %
Vitamin A	0.24 IU	0.01 IU
Vitamin C	57.42 mg	4.87 mg
Potassium	704.7 mg	1.02 mg
Calcium	37.2 mg	1.51 mg
Magnesium	69.8 mg	0.57 mg
Sodium	14.3 mg	2.77 mg
Iron	4.62 mg	0.72 mg
Zinc	1.35 mg	0.24 mg

"Iniya" powdered jaggery is rich in calcium, iron, potassium, magnesium, zinc, copper, and vitamins A and C. With its high energy value and nutrient density, it helps combat malnutrition, supports heart health, aids digestion, and boosts immunity. Thus, it is both a natural sweetener and a functional food for better public health.

R. Gomathi, R. Karuppaiyan, T. Arumuganathan, P. Murali, G.S. Suresha, P. Geetha, R. Arun Kumar, M.Alagupalamuthirsolai, U. Dinesh, R. Raja, P. Amsaveni and G. Hemaprabha
ICAR-Sugarcane Breeding Institute, Coimbatore - 641007.

Outreach

Director, ICAR-SBI and team visit the field of an award-winning organic sugarcane farmer cum entrepreneur!

Shri. V. Antonysamy, S/o. Shri. Viyagappa nadar, an 82-year-old innovative organic sugarcane farmer of Puliangudi, Tenkasi district, Tamil Nadu was honoured with the 'Cane-ovator' award, by ICAR – Sugarcane Breeding Institute, during '*Cane-ovate*', a National-level workshop for innovative sugarcane farmers of the country, held in Coimbatore.

The Director of ICAR-SBI, Dr. G. Hemaprabha along with Dr. C. Palaniswami, PS & Head, Soil Science, Dr. C. Sankaranarayanan, PS & Head, Nematology and Dr. D. Puthira Prathap, PS & Head, Agricultural Extension, visited Shri Antonysamy's field on 14.06.24.

What sets Shri Antonysamy apart from other farmers is that he has been able to get a yield of about 200 tonnes / ha from his organically-certified sugarcane - Co 86032 - field spread over 7.2 ha, in its 30th ratoon.

Shri. Anthonysamy attributes this high-yield to the importance he accords to soil health, by way of incorporating sugarcane trash and intercrops in his field, which are the sole external inputs. The organic carbon content of his field has also been increasing over the years, due to this practice.

Shri Antonysamy has also turned into an entrepreneur by producing organic jaggery and distributing at a premium price at the market.

The ICAR-SBI team inspected his field and interacted with Shri. Antonysamy to document his long and successful experience with sugarcane farming.

Shri. P. Vivekanandan of SEVA, Madurai and BSc (Ag.) students of Gandhigram Rural Institute accompanied the team during the visit.

The Director wished him the best in all his future endeavours in agriculture and hoped the sugarcane farmers of the country emulate the success of Shri Antonysamy !

ICAR-SBI team at Shri Antonysamy's farm

- ICAR-SBI organised the **Training Campaign for Tribal Sugarcane Farmers** in Karumanthurai, Salem Dist, on 27th June 2024 as part of DAPSTC (Development Action Plan for Scheduled Tribe Component) Project.

Release of Publication entitled 'Sugarcane Varieties suitable for Tamil Nadu' during the Training for Tribal Sugarcane Farmers

Distribution of seed material of Co 14012 to tribal sugarcane farmers

Field day of Co 11015

- A Field Day was organized for the cane variety Co 11015 on 28 June 2024 in Rajanthangal village, Kilpennathur Taluk, Tiruvannamalai Dt. During this event, farmers in the vicinity and extension personnel were invited to witness the Frontline Demonstration field of the short-duration variety Co 11015, belonging to Shri. D.Gnanasekaran, S/o. Shri Dhanavel (a registered cane grower of Rajshree Sugars; DoP: 21.01.2024)

Co 11015 Field day in Tiruvannamalai District

Sugarcane farmers and development personnel along-with ICAR-SBI scientists during the Field day

- A demonstration was conducted in the field of Mr. Jagmeet Singh, Village Phoosgarh, Karnal, Haryana on 29.04.2024 for highlighting the benefits of settling transplanting method of sugarcane crop, variety Co 15023 after wheat sowing.
- An Impact evaluation of 'DAPSTC' project was conducted at Galithimbam, Mavanatham, Bejalatti and Ramanai tribal hamlets of Sathyamangalam Tiger Reserve on 30th May 2024.

Impact evaluation of DAPSTC project at Sathyamangalam Tiger Reserve

Deputy Director General (CS), ICAR inaugurates ICAR – Sugarcane Breeding Institute's *ex-situ* facility for conservation of Wild Saccharum Germplasm

Dr. T.R. Sharma, Deputy Director General (Crop Science), Indian Council of Agricultural Research, New Delhi inaugurated ICAR -Sugarcane Breeding Institute's state of the art, *ex-situ* facility for conservation of Wild Saccharum Germplasm in Coimbatore in the presence of Dr. D.K. Yadava, ADG (Seed), ICAR, New Delhi, Dr G.P Singh, Director ICAR-National Bureau of Plant Genetic Resources, New Delhi , Dr G. Hemaprabha, Director, ICAR-SBI and scientists of the Institute, on 1 April 2024.

This new facility for conservation of wild Saccharum germplasm, would help in maintenance of germplasm without any mixing- up and could be ratooned for few years once established, thereby reducing the need for every year re-planting.

These germplasm accessions would help in genetic and evolutionary studies about the contribution of different progenitor genomes and would aid in preservation of sugarcane genetic resources for posterity.

The DDG (CS), ICAR also inaugurated a kiosk near the Western entrance of the Institute for sale of Institute' products and the VIP suite facility in the Institute premises.

Inauguration of ex-situ facility for conservation of Wild Saccharum Germplasm

Academics

A Ph.D viva-voce presentation by Mrs. Amala Mol D on her thesis work entitled "Deciphering the functional roles of candidate secreted molecular signatures of Colletotrichum falcatum - CfEPL 1, CfPDIP and CfBYS 1 during their interaction with sugarcane was held on 18.04.2024 at ICAR-Sugarcane Breeding Institute, Coimbatore

Trainings

- Dr.C.Sankaranarayanan and Dr.B.Singaravelu : Training programme on 'Identification of Phytophagus Scarabs' during 20-25, May 2024 held at Dept. of Entomology, UAS, GKVK, Bengaluru organized by ICAR-AINP Soil Arthropod Pests.
- Dr.R.Valarmathi: DST-SERB 'International Research Experience (SIRE)' Fellowship programme, GoI at School of Plant, Environmental Sciences, Louisiana State University Agricultural Centre, USA for a period of six months from 08.12.2023 to 07.06.2024

Awards and Recognitions

Dr.A.Ramesh Sundar had been admitted as Fellow of National Academy of Agricultural Sciences (NAAS) during the Foundation Day Programme of the National Academy of Agricultural Sciences (NAAS) held in NASC Complex, New Delhi during 4-5 June 2024

Dr A Ramesh Sundar

Media efforts/Other activities

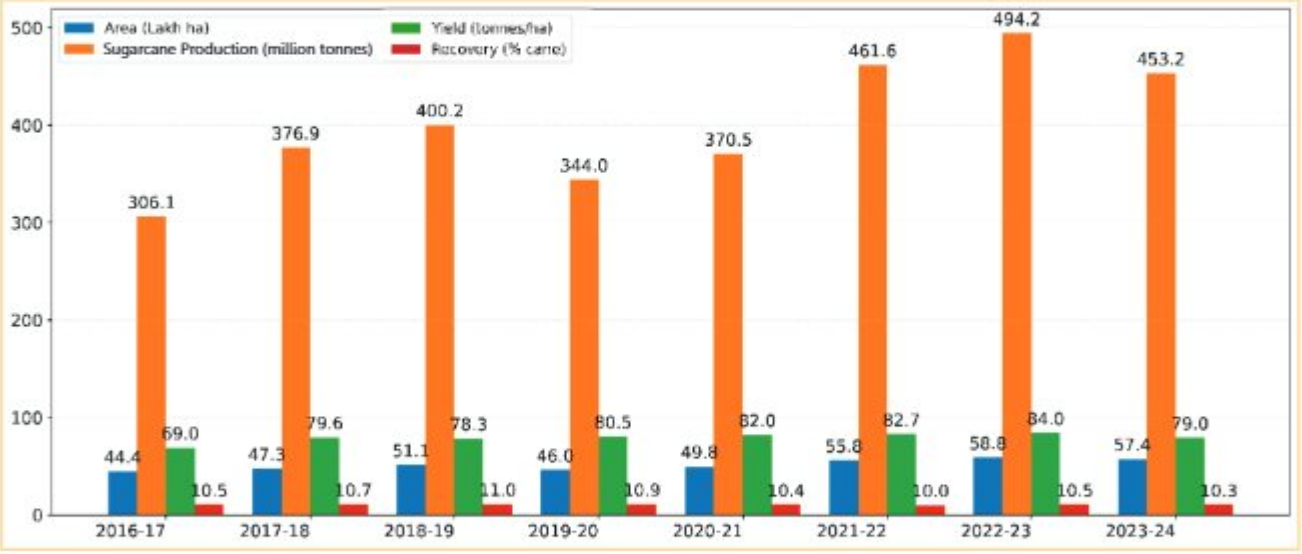
- A radio feature on the 'Impact evaluation' of DAPSTC project in Sathyamangalam Tiger Reserve was broadcast through All India Radio, Coimbatore in its 'Oorpurathile' programme on 16.6.2024.
- A video -feature on Soil Moisture Indicator and Digital Soil Moisture Indicator was published in News18 news channel (https://tamil.news18.com/technology/coimbatore-sugarcane-breeding-institute-discover-soil-moisture-indicator-for-water-saving-rkj-mkn-local18-1586209.html)
- A radio talk on 'World day to combat desertification and droughts' has been delivered by Dr.V.Kasturi Thilagam, SS, recorded at AIR studio on 10 June 2024.
- A radio talk on 'STT – an integrated approach for sustainable sugarcane production' has been delivered by Dr.A.Vennila, PS, recorded at AIR studio on 10 June 2024.
- An Expert Team from ICAR-SBI comprising Dr.G.Hemaprabha, Director & Expert Team Nodal Officer, Dr. A.Ramesh Sundar and Dr.C Palaniswami visited Kibose Sugar and Allied Industries, Kenya from 7-14, May 2024 to provide recommendations on varieties and best agricultural practices of sugarcane suitable to the suggested region of Kenya.
- Licensed EPN Biopesticide formulation to Bannari Amman Sugars Limited, Sathiyamangalam.
- Novel Bt isolate, Bt 41 deposited as patent culture with International Deposit Authority at National Agriculturally Important microbial Culture Collection, Maunath Bhanjan, UP, was given an accession number of NAIMCC-IDA-7.

Licensed ICAR-SBI EPN biopesticide formulation to Bannari Amman Sugars Ltd, Erode, Tamil Nadu

APPOINTMENT/TRANSFER/RETIREMENT/PROMOTION

- Dr. Kona Praveen, Scientist transferred from ICAR-Directorate of Groundnut Research, Junagadh & joined at SBI, Coimbatore on 05.06.2024.
- Sh.M.Karthick, Technical Assistant transferred to ICAR-CTRI, RS, Vedasandur on 03.05.2024.
- Dr.K.Raja, Technical Assistant transferred from ICAR-CTRI, RS, Vedasandur & Joined at ICAR-SBI, Coimbatore on 08.05.2024.
- Sh.S.Ananthakumar, appointed as Technical Trainee (T-1) w.e.f. 09.04.2024.
- Sh.Sharique Buhuzaifa, appointed as Technical Trainee (T-1) w.e.f.03.05.2024.
- Sh.Dharmendra kumar, appointed as Technical Trainee (T-1) w.e.f. 03.05.2024.
- Sh.Pramod Sharma, appointed as Technical Trainee (T-1) w.e.f. 06.05.2024.
- Sh.Suman Saurabh, appointed as Technical Trainee (T-1) w.e.f. 06.05.2024.
- Sh.Satyendra Kumar, appointed as Technical Trainee (T-1) w.e.f. 06.05.2024.
- Sh.Abhishek Kumar, appointed as Technical Trainee (T-1) w.e.f. 09.05.2024.
- Dr.P.Murali, Senior Scientist promoted as Principal Scientist w.e.f. 12.06.2022.
- Dr.K.Mohanraj, Senior Scientist promoted as Principal Scientist w.e.f. 07.01.2023.
- Dr.Ravinder Kumar, Senior Scientist, ICAR-SBIRC, Karnal promoted as Principal Scientist w.e.f. 26.02.2023.
- Dr.K.P. Salin, Principal Scientist, retired on superannuation on 31.05.2024.
- Sh.M.Thangaraj, Skilled Support Staff, retired on superannuation on 30.04.2024.
- Sh.L.Enjerappan, Skilled Support Staff retired on superannuation on 31.05.2024.
- Sh.R.Jogappan, Skilled Support Staff retired on superannuation on 30.06.2024.

Area, Sugarcane production , productivity and Sugar recovery (%) of Sugarcane



Area, Sugarcane production, productivity and sugar recovery (%) of sugarcane

- From the area perspective, sugarcane cultivation expanded from 44.4 lakh ha in 2016–17 to a peak of 58.8 lakh ha in 2022–23, before moderating slightly to 57.4 lakh ha in 2023–24.
- Sugarcane production exhibits considerable volatility, falling to a low of 306.1 million tonnes in 2016–17, then recovering strongly to 400.2 million tonnes in 2018–19. After another dip in 2019–20 (344.0 million tonnes), production rebounded to 461.6 million tonnes in 2021–22 and peaked at 494.2 million tonnes in 2022–23.
- In terms of yield (tonnes/ha), there is a clear upward trend with improvements from 69.0 t/ha in 2016–17 to a record 84.0 t/ha in 2022–23, before moderating to 79.0 t/ha in 2023–24.
- The sugar recovery percentage has gradually increased to the highest ever value of 11.0% in 2018–19 and a modest to 10.3% in 2023–24 due to diversion of cane juice towards fuel ethanol production.

Sir T S Venkatraman's presentation at the Indian Science Congress – 96 years ago!

BREEDING IMPROVED SUGARCANES FOR THE PUNJAB.*

BY

RAO SAHIB T. S. VENKATRAMAN, B.A.,

Government Sugarcane Expert, Coimbatore.

I. INTRODUCTION.

Now that two of the Coimbatore seedling canes are spreading into cultivation in this province, I have thought, it would not be out of place to interest this audience in the salient facts connected with the breeding of improved sugarcanes for the Punjab. In the present state of our knowledge, the breeding of improved canes for North India, including the Punjab, has to be carried on in the south in tropical India ; as such, a short description of the main features of sugarcane breeding is not likely to be too familiar to a North Indian audience. Cane breeding differs in certain important respects from the breeding of most other agricultural crops ; and this difference is not always fully realized even by those whose life work is on crops. This is my third reason for presenting this paper here.

Breeding Improved Sugarcanes for the Punjab: Paper that was read at the 14th Indian Science Congress held at Lahore, Pakistan in 1927

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