



# UPCSR

*at a glance*



उ.प्र. गन्ना शोध परिषद  
शाहजहाँपुर

प्रशासनिक भवन



## U.P.Council of Sugarcane Research

Shahjahanpur-242001, Uttar Pradesh, India

Website: [www.upcsr.org](http://www.upcsr.org)

Email: [dirupcsr@gmail.com](mailto:dirupcsr@gmail.com)

## About UPCS

The U.P. Council of Sugarcane Research has a rich history dating back to its inception in 1912 when it was established as a Research Centre by Mr. George Clarke, who was then the Agricultural Chemist and later became the Director of Agriculture. In 1944, the State Government appointed the first Director of Sugarcane Research in U.P. at Shahjahanpur, placing it under the administrative control of the Director of Agriculture in Lucknow.



A significant milestone occurred in December 1976 when Mahamahim Rajyapal, U.P., approved the establishment of the U.P. Council of Sugarcane Research in Shahjahanpur, marking a significant acceleration in research efforts. Since its establishment, the U.P. Council of Sugarcane Research has been dedicated to developing sugarcane varieties suitable for diverse agro-climatic regions within the state. Moreover, it has been at the forefront of pioneering technologies aimed at enhancing sugarcane and sugar production.

### Mandate and Objectives

**Research Excellence:** Our primary focus is on conducting comprehensive research encompassing various facets of sugarcane, with a special emphasis on breeding and enhancing productivity.

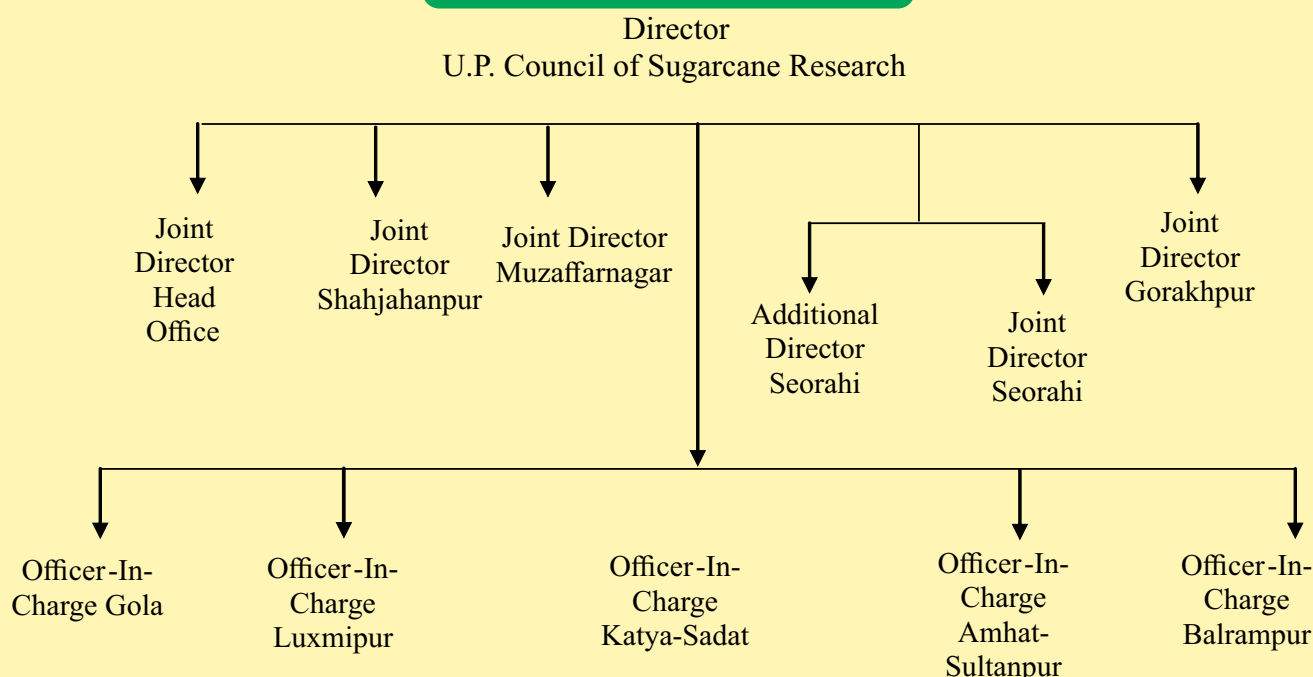
**Varietal Evolution:** We are dedicated to the development of sugarcane varieties tailored to suit the diverse agro-climatic regions within the state, thereby contributing to sustainable agricultural practices.

**Seed Propagation:** We play a crucial role in producing and multiplying nucleus seeds of improved sugarcane varieties. These seeds are then used to establish foundation nurseries at the growers' fields, further promoting the adoption of superior sugarcane varieties.

**Knowledge Dissemination:** We actively disseminate our research findings through various communication channels and media, ensuring that our valuable insights reach a broader audience, including farmers, policymakers, and the scientific community.

**Empowering through Training:** In our commitment to enhancing sugarcane cultivation, we provide training to farmers and cane development staff. This education equips them with the knowledge and skills necessary to optimize sugarcane production and quality.

## ORGANIZATIONAL STRUCTURE



## Affiliated Research Stations and Seed Multiplication Centers

## Research Disciplines under UPCR (Shahjahanpur)

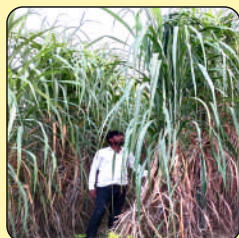
S.No.	Stations	Year of establishment	Total Area (ha)	Cultivated Area (ha)
1	SRI, Shahjahanpur	1912	101.35	79.81
	Muzaffarnagar	1934	40.20	32.42
3	Gola-Research	1961		
4	Gola-Seed	1974	104.74	89.20
5	GSSBRI, Seorahi	1975	114.58	87.31
6	Luxmipur	1968	30.10	22.31
7	Amhat	1987	14.17	13.23
8	Sadat	1987	39.58	26.12
9	Balrampur	2002	16.18	13.18
10	Sirsa	2018	14.80	14.80
11	Pipraich, Gorakhpur	2019	16.65	14.0
<b>Total</b>			<b>492.35</b>	<b>392.38</b>

1	Genetics & Cytogenetics	11	Biotechnology
2	Tissue Culture	12	Central Lab
3	Breeding	13	Plant Pathology
4	Agronomy	14	Entomology
5	Sugar Chemistry	15	Biological control
6	Soil Chemistry	16	Soil Microbiology
7	Gur and Khandsari	17	Seed Production
8	Biochemistry	18	Extension
9	Pesticide Chemistry	19	Economics
10	Physiology	20	Statistics

## TECHNOLOGIES DEVELOPED AT UPCR

### Varietal Development Program

To date, a remarkable total of 237 elite sugarcane varieties have been developed and accepted, starting from 1918. These varieties continue to play a pivotal role in serving the sugarcane industry. Currently, there are 62 varieties in cultivation, comprising 28 early-maturing and 34 mid-late varieties. Notably, a few of these varieties have been released as part of the All India Coordinated Research Project (AICRP), showcasing the ongoing commitment to advancing sugarcane agriculture.



Variety	Year of release	Parentage	Cane (t/ha)	yield
CoS 08272	2011	CoSe 92423 GC	105-110	
CoS 08279	2012	CoLk.8102X Co.89003	101-106	
CoS 08276	2014	CoLk.8102X CoSe.92423	103.09	
CoS 12232	2015	CoS 95255 X CoS 510	101.87	
CoSe 11453	2015	B.O.91GC	101.81	
CoS 09232	2018	Co.1148 P.C	96.10	
CoS 13231	2018	CoS 95255 XCoS 510	83.09	
CoS 13235	2019	MS 6847 X Co 1148	91.66	
CoSe 13452	2019	CoSe.92423 XCo 86249	86-95	
CoS 14233	2020	CoS 92263 GC.	93.71	
CoS 17231	2022	CoV 89101 XCoS 96260	83.01	
UP 14234	2022	S.539/99XS. 301/87	89.98	
CoS 16233	2023	Co89003XCo Se 92423	87.65	
CoS 15233	2023	CoH 56 GC	93.48	

### Sugarcane Germplasm Conservation

Currently, a total of 526 sugarcane varieties, encompassing 61 different species, are meticulously maintained under genetically pure and disease-free conditions at Shahjahanpur. This extensive collection highlights the commitment to preserving a diverse genetic pool for ongoing sugarcane research and development.



### U.P. Method of Seedling Raising

The 'U.P. Method of Seedling Raising' represents a significant innovation that enables the successful cultivation of sugarcane seedlings from the true seed (fluff) on a large scale, without the need for a protective glass house. This groundbreaking method has revolutionized the way seedlings are raised in open fields, making it a feasible and practical approach for sugarcane agriculture.

### Modified Lantern Method of Crossing

The development of the 'Modified Lantern Method of Crossing' in 1976 marked a pivotal milestone in India's sugarcane breeding program. This innovative technique ushered in a new era by significantly enhancing the efficiency and effectiveness of sugarcane breeding.



### Modified Trench Method of Planting



The 'Modified Trench Method of Planting' at UPCSR represents an advanced approach designed to enhance sugarcane production. This innovative method incorporates specific alterations to traditional planting techniques, resulting in improved yields and greater efficiency in sugarcane cultivation. Notably, within the Trench Method of Planting, the most favorable cane yields were achieved through paired row planting of sugarcane with a row spacing of 30 cm and a pairing interval of 90 cm. Paired row planting at 30 cm row spacing and 120 cm pairing interval also demonstrated high cane yields.

### Screening Against Red Rot Disease at the Seedling Stage For Precision in the Varietal Screening Programme

Screening sugarcane varieties for resistance against red rot disease at the seedling stage is a vital component of our varietal screening program. This early-stage evaluation ensures precision in the selection process. By identifying and selecting varieties with resistance to red rot at the seedling stage, we enhance the efficiency and accuracy of our varietal screening program.

### Varietal Replacement Programme

The Varietal Replacement Program is a strategic initiative aimed at replacing older, deteriorated sugarcane varieties with newer and improved ones. This program ensures the continuous rejuvenation of sugarcane cultivars, promoting enhanced productivity, disease resistance, and overall crop quality. By systematically replacing outdated varieties with more suitable and high-performing options, this program plays a crucial role in advancing the sugarcane industry and maintaining its competitiveness.



### Breeder seed production during last five years

Year	Breeder production/distribution (Qtl)	Seed
2018-19	116798	
2019-20	150774	
2020-21	156250	
2021-22	158247	
2022 23	167715	
Total	749784	

### Faster Seed multiplication and distribution (Single Bud)

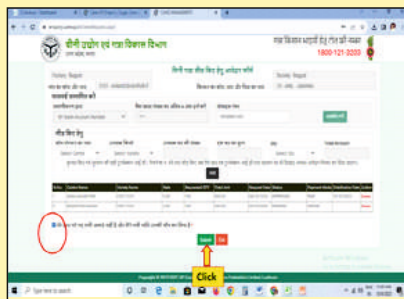
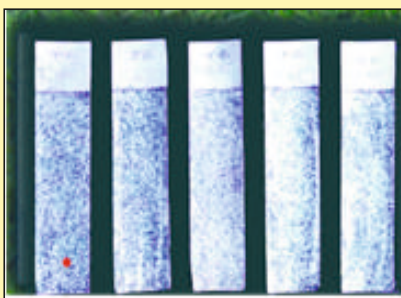
Variety	2020-21	2021-22	2022-23	Total
CoS 17231	-	-	214900	214900
CoS 13235	682591	21297257	31849879	53829727
CoLK 14201	36325	2993815	20309395	23339535
Co 15023	-	-	4019134	4019134
CoS 16233	-	-	165000	165000
CoLk 15233	-	-	2600	2600
Total	718916	24291072	56560908	81570896

## UPCSR going digital....Online Mini Seed Kit Booking

UPCSR is embracing digital transformation with the launch of an online seed booking portal, streamlining seed dissemination. In March 2023, the distribution of 4,000 single-bud mini kits in a single day exemplified the efficiency of this system. Moreover, plans for the distribution of 6,000 kits of new varieties on October 21-22, 2023, underscore the commitment to innovative and accessible agricultural solutions.

## Biological Control Measures

We have developed and are actively implementing biological control measures at growers' fields by deploying beneficial organisms, such as *Trichogramma*, *Beauveria bassiana*, and *Metarrhizium anisopliae*. These bioagents are used to manage pests and diseases in a more sustainable and environmentally friendly manner, reducing the reliance on chemical pesticides. This approach promotes a balanced ecosystem and helps safeguard the health and productivity of sugarcane crops while minimizing the environmental impact.



## Details of the last five years of production of bio-product (Qtl)

Years	Ankush	Azotobactor	PSB	OD	Bb/Mt	Total production	Total Revenue with G.S.T.
2018-19	29034	307	489	1648	-	31478	16,83,724
2019-20	41771	132	157	568	-	42628	23,86,434
2020-21	53664	699	879	555	-	55797	31,15,164
2021-22	55568	195	455	520	-	56738	31,73,428
2022-23	41560	7100	9596	3721	2714	64691	38,26,488
<b>Total</b>	<b>221597</b>	<b>8433</b>	<b>11576</b>	<b>7012</b>	<b>2714</b>	<b>251332</b>	<b>1,41,84,238</b>

## Soil Survey

We conduct comprehensive soil surveys in the sugar factory zones of Uttar Pradesh, gathering essential data on soil composition and quality. Based on the results of these surveys, we provide specific fertilizer recommendations that are tailored to the unique soil conditions in each area. This approach ensures that farmers receive precise guidance on fertilization practices, promoting efficient nutrient management and optimal crop growth in the sugar industry. Over the past five years, the UPCSAR has diligently examined and provided expert recommendations based on the analysis of 17,043 soil samples to the relevant authorities.



## Protocols For in Vitro Regeneration of Sugarcane

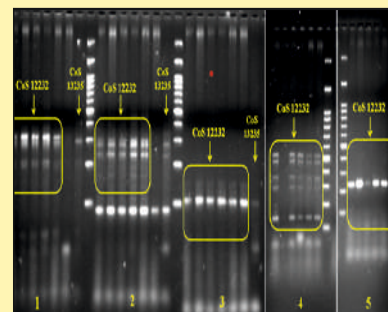
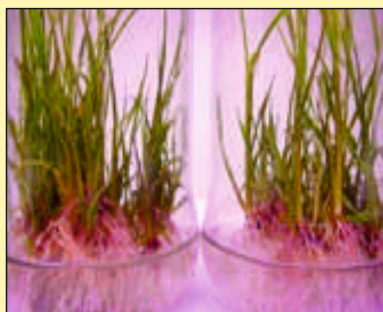


We have developed precise protocols for the in vitro regeneration of sugarcane from various explants, which are instrumental in seed production. These protocols provide step-by-step instructions and techniques for generating new sugarcane plants from different types of plant materials. This in vitro regeneration process is crucial for maintaining the genetic purity and quality of sugarcane seeds, ultimately contributing to the production of high-performing and disease-resistant sugarcane varieties.

## Bt Transgenic Plants of Sugarcane Variety CoS 96268 has been Developed & DNA Fingerprinting of Existing Sugarcane Varieties

We have successfully developed Bt transgenic plants of the sugarcane variety CoS 96268. Notably, five of these Bt sugarcane plants derived from CoS 96268 have exhibited resistance to artificial early shoot borer infestation when subjected to controlled conditions in a greenhouse. This development holds great promise for mitigating early shoot borer infestation and its impact on sugarcane yields.

In addition, we are actively engaged in the process of DNA fingerprinting for existing sugarcane varieties. This initiative is aimed at facilitating varietal identification and ensuring the accuracy of sugarcane variety classification, which is essential for the sugar industry and agricultural management.



## Varietal Screening Using Scientific Parameters for Commercial Production of Jaggery & Value Added Jaggery Products



We conduct varietal screening using precise scientific parameters to identify sugarcane varieties suitable for commercial jaggery production. By applying rigorous scientific criteria, we ensure that the selected varieties meet the specific requirements and standards for jaggery processing. This approach aims to optimize the quality and yield of jaggery, contributing to the production of high-quality, commercially viable jaggery

products. Value-added jaggery products, such as jaggery powder, solid jaggery, and liquid jaggery, are also meticulously prepared through a scientifically informed process. In addition to the production process, we provide comprehensive training to manufacturers and growers to ensure the consistent quality and adherence to industry standards.

## Preparation of Sugarcane Seedlings

The STP Method of Seedling Raising represents an innovative approach to rapidly multiply new sugarcane varieties. This method leverages technology to efficiently produce a large number of disease-free and genetically identical plantlets, expediting the multiplication of new sugarcane varieties for commercial cultivation.



## Developing Registered Seed Cane Producer Farmer

Within the jurisdiction of U.P.C.S.R. Shahjahanpur, we've registered a total of 1,550 innovative farmers as certified seed cane producers until FY 2023. These farmers actively cultivate high-yield sugarcane varieties under the guidance of research institutes, and their produced seed cane is made available to other sugarcane farmers at state-mandated rates through the State Cane Department. This collaborative effort is a significant step forward in enhancing sugarcane agriculture.

## Profile of Post-Harvest Quality Deterioration in Promising Sugarcane Varieties



The process involves evaluating and creating a detailed profile of post-harvest quality deterioration in promising sugarcane varieties. This assessment is essential for establishing an effective calendar and harvest schedule.

## Mechanization Adopted at UPCS

Mechanization at UPCS is implemented to reduce the cost of sugarcane production and increase recovery. This includes the use of machinery for planting, harvesting, irrigation, and weed control, resulting in more cost-effective and efficient agricultural practices while improving sugar recovery rates.



## New Irrigation Technology to Improve Water Use Efficiency

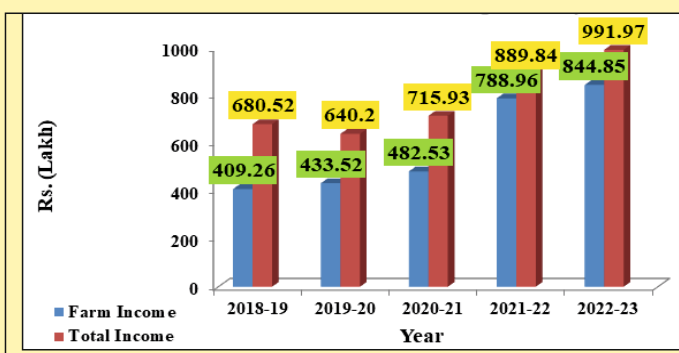
Our cutting-edge irrigation technology, boasting a plant geometry set at 67 by 134 cm, offers an exceptional boost in water use efficiency. This system focuses on targeted irrigation between two rows, forming 134 cm-wide blocks. What truly sets this technology apart is its remarkable water efficiency, requiring just 64% of the water compared to conventional flood irrigation methods.



## Vermi-Compost Facility

The establishment of a vermi-compost facility at UPCS signifies our commitment to sustainable agriculture practices. This facility utilizes earthworms to transform organic matter into nutrient-rich compost, contributing to improved soil health and fertility. Vermi-compost is an eco-friendly alternative to chemical fertilizers and is an integral part of our efforts to promote environmentally responsible farming techniques.

## Farm & Total Income



Over the past five years, the farm and total income of UPCSR has displayed a consistent upward trend, reflecting successful agricultural and research initiatives. This positive trajectory is indicative of the organization's commitment to sustainable and progressive farming practices and its contributions to the sugarcane industry.

## Services of UPCSR

**Consultancy Services:** Providing expert guidance to sugar mills for evaluating processing losses and offering potential solutions to address these issues, thereby enhancing efficiency in sugar production.

**Survey & Surveillance of Sugarcane Diseases, Insects & Pests:** Annually, we conduct a Survey & Surveillance of Sugarcane Diseases, Insects & Pests in Uttar Pradesh, providing an accurate assessment of the prevailing conditions.

**National/International Seminars:** Organizing and participating in seminars on a national and international scale, facilitating the exchange of knowledge, ideas, and advancements in sugarcane research and agriculture.

**Training Programs:** Offering training programs to cane development staff and sugar factory personnel, empowering them with the latest techniques and best practices in the sugarcane industry.

**Demonstration Trials:** Conducting trials that showcase sugarcane cultivation best practices, intercropping methods, and effective disease and pest management, providing practical insights for farmers.

**Farmer's Fairs and Goshthies:** Hosting events and gatherings for farmers to share knowledge, experiences, and innovations, fostering a sense of community and mutual learning.

**Extension Services:** Disseminating information through personal contacts and employing audio-visual aids, such as radio and TV talks, to reach a wider audience and educate them about sugarcane-related topics.

**Extension Through Literature:** Publishing educational materials like books, bulletins, pamphlets, and leaflets to make information more accessible to farmers and stakeholders.

**Adoption of 'Adarsh Ganna Gram':** Encouraging the adoption of model sugarcane villages or 'Adarsh Ganna Grams,' which serve as exemplars for sustainable sugarcane cultivation practices and rural development.



## Products & Publications

- \* Organo- Decomposer
- \* Biofertilizers
- \* Ankush
- \* Trichocard
- \* Beauveria bassiana
- \* Metarhizium anisopliae
- \* Chemical free Jaggery



Published by:

**Dr. S.K.Shukla, Director, UPCSR, Shahjahanpur**

Compiled & edited by: Dr. Priyanka Singh

For further information, Please write to:

The Director, U.P.Council of Sugarcane Research Shahjahanpur-242001, Uttar Pradesh, India

Phone Fax: 05842-22250 Website: [www.upcsr.org](http://www.upcsr.org) Email: [dirupcsr@gmail.com](mailto:dirupcsr@gmail.com)