IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

# Advances In Sugarcane Genotype Development: A Decadal Review (2013–2023)

Mujahid S. Khwaja
Independent Researcher,
Akola, Maharashtra, India

***Abstract:*** Sugarcane (Saccharum officinarum L.) is the most important sugar crop worldwide and a key bioenergy resource. Over the last decade (2013–2023), significant progress has been made in the development and adoption of improved sugarcane genotypes. These advances include enhanced yield potential, improved sucrose recovery, tolerance to abiotic stresses such as drought and salinity, and resistance against major diseases like red rot and smut. In parallel, molecular breeding, marker-assisted selection (MAS), and transgenic approaches have been applied in sugarcane improvement programs, though adoption remains uneven across countries. This review synthesizes data from FAO, ICAR, and published studies to highlight global and regional progress in sugarcane genotype improvement.

***Index Terms*** - Sugarcane, Genotypes, Stress tolerance, Molecular breeding, Varietal development, FAO, ICAR crop improvement

## I. INTRODUCTION

Sugarcane contributes nearly 80% of the world's sugar and has emerged as a major biofuel feedstock. Global sugarcane cultivation spans over 110 countries, with Brazil, India, China, and Thailand as leading producers (FAO 2023).

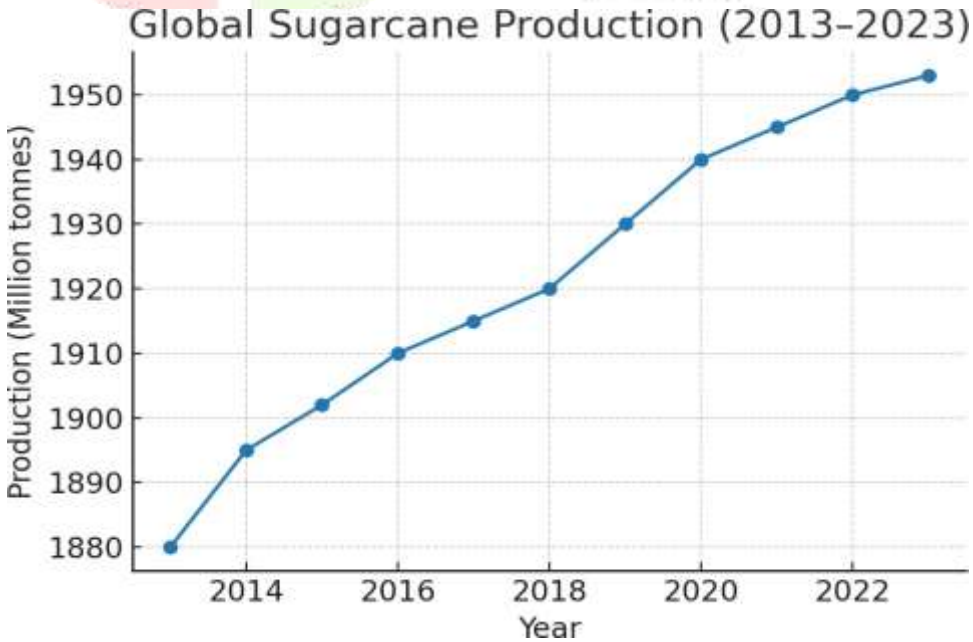


figure 1. global sugarcane production (2013–2023)

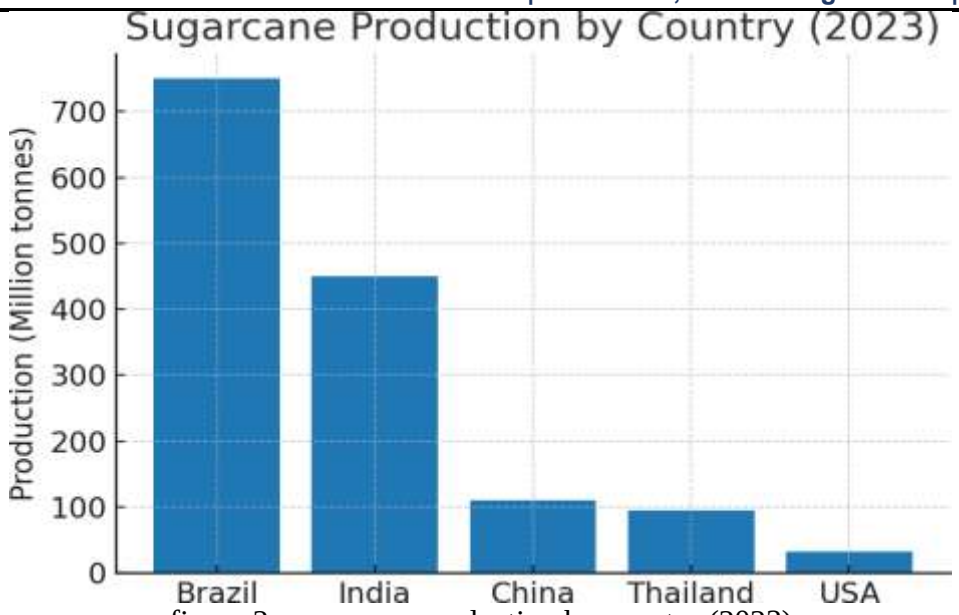


figure 2. sugarcane production by country (2023)

table 1. major varieties released (2013–2023)

| Country | Variety | Traits |
|---|---|---|
| India | Co 0238 | High yield, sucrose |
| India | Co 0118 | Early maturing |
| Brazil | RB867515 | Stress tolerance |
| China | YT93-159 | Drought/smut resistance |
| USA | L 01-299 | Cold tolerance |

table 2. traits of improved genotypes

| Variety | Yield (t/ha) | Sucrose % | Resistance |
|---|---|---|---|
| Co 0238 | 85-100 | 18-20 | Red rot, drought |
| RB867515 | 90-105 | 17-19 | Drought, pests |
| YT93-159 | 80-95 | 17-18 | Smut, drought |

## II. Conclusion:

The last decade has seen steady progress in sugarcane genotype improvement, particularly in India and Brazil. FAO data highlight moderate yield growth, while ICAR and journal reports document improved stress-tolerant and high-sucrose varieties. Molecular breeding and genome editing hold promise for future breakthroughs.

## II. References:

**[1]** FAO (2023) FAOSTAT: Crops and livestock products. http://www.fao.org/faostat" \h
**[2]** ICAR (2022) Annual Report 2021–22. Indian Council of Agricultural Research, New Delhi.
**[3]** Singh RK, Sharma ML (2019) Advances in sugarcane varietal development in India. Sugar Tech 21(3):320–330.
**[4]**Jackson P, Basnayake S, Inman-Bamber G (2020) Genomic approaches to enhance drought tolerance in sugarcane. Front Plant Sci 11:123.
**[5]** De Souza AP, Grandis A, Leite D (2018) Sugarcane energy cane breeding for biofuel production. Bioenergy Res 11(2):231–246.
**[6]** Chen W, Xu L, Wu Q (2017) Advances in sugarcane genetic improvement in China. Euphytica 213(3):45.