

2 Genome-Edited Rice Varieties Developed in India

Prelims - Current events of national and international importance.

Why in News?

Recently, Union Agriculture Minister released 2 genome-edited varieties of rice.

• India Becomes the 1^{st} Country in the World to develop genome-edited rice varieties.

The genome is the entire set of DNA instructions found in a cell. In humans, the genome consists of 23 pairs of chromosomes located in the cell's nucleus.

- 2 genome edited rice verities
 - DRR Rice 100 (Kamla)
 - Pusa DST Rice
- **Developed by** Indian Council of Agricultural Research (ICAR).

In 2018, ICAR initiated genome-editing research to improve two major rice varieties – **Samba Mahsuri and MTU 1010**, under the National Agricultural Science Fund.

- **Development technology** It is by using genome-editing technology **based on CRISPR-Cas**, which makes precise changes in the organism's genetic material without adding foreign DNA.
- Genome editing of *SDN 1 and SDN 2 types of genes* has been approved under India's biosafety regulations for general crops.

DRR Rice 100 (Kamala) variety

- Developed by ICAR- IIRR (Indian Institute of Rice Research), Hyderabad.
- Based on Samba Mahsuri (BPT 5204).
- Objective To <u>increase the number of grains</u> per panicle and it matures 20 days earlier (~130 days).
- Benefits Due to its <u>shorter duration</u>, it helps save water and fertilizers and reduces methane gas emissions.
- Its stalk is strong and does not fall.
- The rice quality is similar to the original variety, Samba Mahsuri.

Pusa DST Rice 1

- Developed by ICAR-IARI (Indian Agricultural Research Institute), New Delhi
- Based on MTU 1010.
- Benefits It can increase yields by 9.66% to 30.4% in saline and alkaline soils, with the potential for up to 20% increase in production.

- **Significance** It hold the potential for revolutionary changes in higher production, climate adaptability, and water conservation.
 - A 19% increase in yield.
 - A 20% reduction in greenhouse gas emissions.
 - A saving of 7,500 million cubic meters of irrigation water.
 - Improved tolerance to drought, salinity, and climate stresses.

In the 2023-24 budget, the Government of India allocated ₹500 crores for genome editing in agricultural crops. ICAR has already initiated genome-editing research for several crops, including oilseeds and pulses.

Quick Facts

- ICAR It is an <u>autonomous organisation</u> under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare.
- It has its <u>headquarters at New Delhi</u>.
- It is the apex body for co-ordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country.

Reference

PIB| Launch of 2 Genome Edited Rice Varieties in India

